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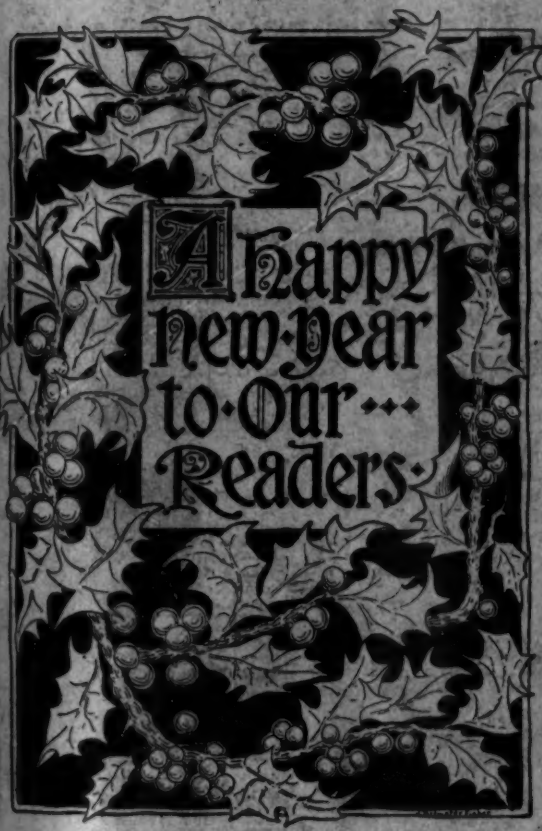

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THE

PRACTICAL TEACHER

A MONTHLY MAGAZINE AND REVIEW

FOR THE SCHOOL-ROOM AND THE STUDY

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'TIS SIXTY YEARS SINCE.

BY J. H. YOXALL, M.P.

III.

"THIS is the only school in the scattered and populous district of which High Green is the centre. The proper schoolroom being cold and damp, was appropriated for various useful purposes, and the school was held in the interior apartment appropriated to the dame. There were ten children sitting round the fire, none above eight years old.

"This was an endowed school, and there is none other at present for a population of 2,000 persons. The only additional instruction was afforded by an old cripple, who is the 'wise man' of the country, named West, and who not only tells fortunes, but is widely famed for supernatural craft touching missing bodies, stolen goods, and stray pigs. This man was till recently a schoolmaster of a select academy of his own..... The children here rarely learn to read or write. None could tell where Scotland was. This school is well endowed.....Fifty collieries taken at random give the following results:—

"Total number of boys, 1,640; number who can write their names, 350. In seven pits there are 172 girls, of whom twelve only can write." This was in Yorkshire.

The incumbent of Bolsterstone said: "Reading, writing, and common arithmetic are taught in the free school. The teacher is competent, but does not give that satisfaction that I could like him to do. *He does not keep pace with the modern improvement in education.*"

"I went one winter to a night school," said Master Stanley, who first "went down" at five years old. He also failed to keep pace with the modern improvements in education. "I am fifteen years old," said Anne Mallender. "I went to the pit when I was nine. I always dress as you saw me there to-day—naked down to the waist, and trousers on. I learn my letters."

Every Teacher should see

THE PRACTICAL TEACHER'S ART MONTHLY,

Now Ready, for January.

Maria Mallender, aged nine and a half, said, "I am a trapper. I have not been a year here. I don't like it because I sit in the dark, but they often give me a bit of candle. I go to a Sunday school, and can read in the *Reading Made Easy*."

Some colliers became schoolmasters. Mr. George Armitage, aged thirty-six, deponed, "I am now a teacher at Hoyland School. I was a collier at Silkstone until I was twenty-two years old, and worked in the pit about ten years." Said William Ramsden, "I am going eleven. I've been five years at pit. I go to Sunday school. I read an A B C. I go where John Sorby teaches." But Joseph Bedford said, "I am eight years old. I came down at six. Sometimes it's four when I go in pit. I don't go to Sunday school. I can't read none." Schoolmaster George Armitage would know how to sympathise with pit-boy scholars. "It is a notorious fact," said Joseph Ellison, Esq., of Birkenshaw near Burhall, "that the colliers, when they cannot breed children enough themselves for the hurriers they want, are forced to apply to the poor-law guardians for pauper children." Poor black-faced little Olivers, with the colliers always "asking for more!"

"The present system of school education, as practised in this village," said James Milnes Stansfeld, Esq., of Manor House, Flockton, "is very defective. It chiefly consists of a short reading lesson either in the Bible or some easy work, without any attempt on the part of the teacher to explain what is read." The education was hardly any better at the pit bottom. "I am eleven and a half years old," Elizabeth Ibbetson said. "I've been two and a half year down this pit. It tires my legs and arms; not much in my back. I get my feet wet. I am wet in the feet now. I come down at seven and eight. I come out at four, and sometimes stay till six. I laked on Saturday, for I had

gotten cold. I push the corve with my head, and it hurts me. I go to Sunday school, to Methodists. I read A B C." But if they got no education to speak of down the pit or elsewhere, the children got wages for their parents and profit for the mine-owners. "I have a shilling for hurrying sixteen corves," said Mary Holmes, fourteen and a half, who went down at six and a half years old. "I went into a pit before I was *five* years old," said Ebenezer Healey (Thus-far-hath-the-Lord-helped-me Healey), thirteen years old, after listening to Mary Holmes, "and *I* get a shilling for sixteen runs a day." "I have given over being at school," said Sarah Swallow, aged eight and a half. "I have been two years in the pit."

But the children were *supposed* to be instructed in mechanics. Lads of ten and even eight years old had charge of the winding-gear. One of them, looking at a mouse, let the gear overwind, and precipitated three other children to the bottom of the shaft. Children were cheap as engineers, of course. "I was not a little surprised," said the commissioner in the west of Scotland, "to find that the management of a high-pressure steam-engine, on the proper working of which many lives depend, was not unfrequently entrusted to a mere boy of from twelve to fourteen years of age." In the east of Scotland "the age at which children are usually sent to school is about five years, and they are generally removed about nineteen." "The day and evening school in the Bo'ness new town is especially for the population employed at the colliery," and "at present the teacher receives about seven shillings per week." Out of 3,836 children and young persons included in a return, "I find that only 866 *pretend* to write their names, and it would require a well-practised eye to decipher even 150 of them." At Liberton it is said that "the status and character of all the teachers would be improved by a liberal provision. At present it is not equal to that of a mason or collier." But at the Elgin School, Balderidge, "in addition to fire, residence, gardens, coals, etc., the first teacher is paid £104 per annum." Mr. David Forrester, teacher, Kirkcaldy, delivered himself of many philosophical observations to the commissioners. "Without children have a sound elementary basis," said he, "Sabbath schools are useless, as the teaching of abstract points of doctrinal divinity to children I consider as impracticable."

Mr. J. R. Leifchild was commissioner in Northumberland and North Durham, and with a fine oratoric roll he also remarked, "I have excluded some testimonies merely vituperative of the tardiness of principals and agents in addressing themselves to the promotion of efficient and extended scholastic instruction." In fact, he quotes the view of A and B, colliery viewers, about the pit children, that "Government interference with their education is not desirable." Mr. Daniel Liddell, teacher, of Newcastle, told him that "the books used in colliery schools are generally *Reading Made Easy*, Markham's *Spelling Book*, and Tinwell's *Arithmetic*."

"Evening scholars to find their own candles," was one of the rules at the Killingworth Colliery Schools, in the report of the master of which the commissioner had to make "some alterations in the grammar and spelling." Mrs. Ann Smith Goodyer, the infant mistress, said "that when she first came oaths were exceedingly common in the mouths of girls of five and seven years old, and they did not scruple at times to call her the most opprobrious names that could be imagined." The need for moralising education was evident almost everywhere, and here is what seems to be the first essayal of undenominationalism. At the Bedlington Ironworks School, "the parents being of various religious denominations, it was thought advisable to put into the hands of their children a catechism which should contain the doctrines of Christianity considered essential by all orthodox Christians, while it does not enter into the peculiarities of any creed." I should greatly like to "happen on" a copy of that catechism now.

In the Cornish mines 2,300 children under thirteen were employed in 1841, 700 of these being girls. "The common day schools" in seven parishes containing 51,500 people had an average attendance of only 1,614. "None of the teachers can be considered persons of education. One or two may be able to teach elementary mathematics and algebra, also a little of land-surveying. None have been trained. One or two have spent a few weeks at a model school. I consider not more than three in this district qualified for their functions. Some are grossly ignorant, and have probably resorted to tuition as being easier than manual labour." About Redruth they were, "for the most part, persons who have become unable to follow other employments." These "teachers" were, of course, very miserably paid.

* * * * *

I bring to an end, not for lack of material but of space, these pictures of school, school life, school methods, and the position of teachers sixty years ago. If I were to pursue the inquiry into the report of the Commission on Agricultural Child Labour, I should find the same classes of facts repeated as true of the rural districts of England as well. One repines sometimes, and with full justification, at the defects of the schools, the ill payment of teachers, and the lack of proper status for the profession which characterise the case in our own day; but if one looks back to what the state of things was only six decades ago, the marvel is not that defects should still obtain, but that so great an elevation has taken place so quickly. The process of improvement moved slowly until 1870, but it has quickened in speed since then. It is due in part to a general amelioration of the conditions and ideas of the nation, but it is due in greater part to the efforts of the teachers, individually and collectively, themselves. Sixty years is but a day in the lifetime of an ancient nation like our own; it is but the duration of one step in the march of education. If we could project the mind and read by prophecy the reports of commissioners on education in England for the years 1941 and 1942! But let us be grateful to the teachers of sixty years since, into whose labours we have entered. They ploughed and they sowed in tears, but they did a great part in preparing the transformation of the old into the modern England. Peace to their ashes. After life's fitful fever they sleep well. Let us praise their memory and pity their lot.

THE SUPPLY OF TEACHERS.—The dearth of teachers seems to remain as keenly felt as ever in London. We read that there are no fewer than 330 actual vacancies on the fixed staff of the Council's schools, and of course the deficiency in the non-provided schools is well known. The managers of the Globe Street School, St. George's, state that although four assistant teachers have been allowed, it has been found impossible since the summer holidays to obtain any response to advertisements or to obtain the services of a supply teacher. The Training Classes established by the School Board have been converted into a Training College for 300 students, and other new colleges are under consideration.

BRITISH MUSEUM

BY MANY HANDS.

"Quot homines, tot sententiæ."

N.U.T. NOTES.

SINCE the day I was first returned a member of the Executive, I have lifted up my voice and pen against the evils of "joint appointments." I do not recollect when the pernicious practice of expecting a schoolmaster to provide a certain portion of the school staff first crept into our educational system, though I remember quite well, towards the close of my college course in the early "eighties," feeling considerably handicapped because I possessed neither the wife nor sister so indispensable, in the majority of instances, to the man seeking appointment in a country school. Years later, as I studied the salary question, I began to understand that the object of parsimonious school managers was to secure the services of two teachers for the remuneration of one, and on this account I consistently opposed the introduction of any reference to "joint salaries" in the scales adopted by the N.U.T. My objection was mainly, if not entirely, professional. There is, however, an educational aspect of this question which has been pointed out by Mr. Gray, M.P., in a forcible memorandum drawn up at the request of the Executive's Education Committee. Mr. Gray states, with perfect accuracy, that when the appointment is made the attention of school managers is concentrated almost entirely and exclusively upon the qualifications of the headmaster. He continues: "His certificate, his testimonials, his personal appearance, are all carefully scrutinised; but the mere assurance that he has a wife who is willing to teach is often accepted without further inquiry." The inevitable and unfortunate consequence is that many ladies enter the schools possessed of no teaching certificate, and often with no previous training whatever; and so long as the husband does his work efficiently, the part played by the wife is of quite secondary importance. The Executive are now appealing, both to the Board of Education and to the authorities constituted under the Education Act of 1902, to put a stop to these joint appointments. Members of the Union can, however, do infinitely more than either of these powerful agencies by (1) insisting on securing adequate remuneration for their individual services, and (2) insisting further that their wives or female relatives shall be separately engaged and paid according to their experience and qualifications.

Joint Appointments.

IT is no uncommon thing, I suppose, for two persons to be reflecting on the same subject at the same time. Yet I confess to deeming it a little singular that, whilst my last "Notes" (which, it may be remembered, contained a plea for the abolition of voting by individual subscribers in "B. and O." elections) were in type awaiting publication, the Council should be considering the following motion by Mr. C. W. Hole:—

The "B. and O." Council.

> "1. That it be a recommendation to the annual meeting that the present system of voting for beneficiaries of the Teachers' Benevolent Fund be abolished.
>
> "2. That the following plan be adopted: That the names of candidates for election to Annuities, Home Allowances, and Orphan Homes be made known only to the permanent officials at the time the case is under consideration. A number shall be given to each application, and a full statement of each case be presented to the Council against a number corresponding to that entered on the application form. The election shall be held by the Council after full consideration of the circumstances of each applicant."

In a particularly lucid speech Mr. Hole enumerated the benefits certain to result from the suggested change. Some of them I shadowed a month ago, and others had not occurred to me at the time. Of course, the greatest advantage to be derived from the transfer of power and the adoption of Mr. Hole's scheme would be that absolutely the *most deserving* candidates would be elected first; which is not necessarily the case nowadays. The usual objections to the innovation were speedily forthcoming—there would be a loss of interest in the work of the Fund; there would be a diminution of subscriptions, etc.; and in the end the motion was defeated by sixteen votes to two. My own impression is that more than two members of the Council were really in favour of the change, though some of the friendly ones thought it unwise of the Council to ask for increased powers for itself. The Council received with the heartiest applause the intelligence that a fine sum of £435 had resulted from the Burnley Bazaar, and special thanks and congratulations were promptly accorded the Burnley teachers in recognition of their splendid work. At the time of penning these lines it looks as if neither Nottingham's magnificent effort of last year, which resulted in the forwarding of £2,336, nor that of Mr. C. W. Hole is likely to be approached. Still, if only some half-dozen towns would emulate the industrious Burnley teachers, there would be no risk of interference with the Fund's beneficent labours.

AN eminently sensible understanding amongst the members of the London Teachers' Association makes it possible for its chief administrative office to be filled by head and class teachers in alternate years. The result of throwing open the door of fellowship to the teachers in the non-provided schools has been a total increase of 1,489 on the membership of last year, the grand total being 10,730. Only the N.U.T. and the N.F.A.T. have a larger member roll, and the office of President of the L.T.A. demands the highest qualities of both head and heart. Mr. W. A. Nicholls has lately assumed its responsibilities, and will make a capable and most fitting successor to the long line of illustrious gentlemen who have preceded him. His presidential address was of so powerful and convincing a character that that good judge Mr. F. W. Hearn proposed that copies should be sent to the metropolitan educational authorities. If these last would but read and study its contents, they would be better qualified to carry on their great work than ever before. The career of Mr. Nicholls has been diversified enough to enable him to speak with authority on practically every phase of the education problem. After completing his college training at Westminster, he took charge, as far back as 1869

The London Teachers' Association.

(when some of our leading men were barely out of their cradles), of a village school on the borders of Lancashire and Cheshire. In 1871 he migrated to Woolwich, where he first served at the head of a Voluntary school, and afterwards as a class master under the London School Board. All along he has taken an active part in political and municipal affairs in Woolwich and Plumstead, and is well known as an able and fluent platform speaker. For two years he represented the South London electoral district on the N.U.T. Executive, and was developing into a first-class member when he lost his seat at Portsmouth. His countless friends and well-wishers believe this loss to be but temporary; and if grit and sterling worth count for anything in South London, Mr. Nicholls will certainly be much nearer the top than the bottom of the poll when Easter Monday arrives.

NEVER within my recollection has there been such an outcry for "more teachers" as there is at the present day. For perhaps the past ten years the supply has barely kept pace with the demand, and the general putting into force of the Education Act of 1902 has certainly revealed to the authorities the vital necessity of strengthening the staffs of the non-provided schools. But the *teachers* do not exist, and I am, for one reason, heartily glad of the fact. Though the profession may offer reasonable inducements to girls, the fathers of promising boys have realised that the prospects are "not good enough" for the brightest of their progeny. Were there a general arrangement amongst the authorities that an annual salary of £200 be assured to *all* certificated masters after (say) fifteen years' service, I venture to prophesy that in four or five years' time we should hear no more talk of "dearth." Meanwhile, some of the authorities are making the most strenuous efforts to cope with the deficiency, offering commencing terms which seem preposterously attractive when compared with those of twenty years ago. Here and there an authority is actually attempting to bind its pupil teachers to return to its area after completing a college training; and, in odd cases, the farce of a penalty is suggested should the agreement be broken. Were the authority to undertake to provide employment for the teachers, when certificated, at reasonable and specified rates of remuneration, the arrangement would be bad educationally. To suggest, however, that the teachers *must* come back, if required, under *any* conditions of service prevailing at the time, and be given no sort of guarantee of employment by the authority is simply iniquitous. From the educational standpoint, nothing could be conceivably worse for the pupils in any one of our counties than to be taught by teachers whose horizon throughout the whole period of training has been the county's geographical boundary. Not only should teachers be trained along with would-be entrants to the learned professions, but the country would be immensely benefited by their being able to move about in the freest possible manner.

Chained to One Locality.

THE gross expenses annually incurred by the Executive under the head of "Travelling" are now very considerable, and also, as members of Conference are from time to time made painfully aware, the cause of much discussion when the Union's balance-sheet is under consideration. Economy in administration is ever necessary, one admits; yet it is largely forgotten that during the past six or seven years the Executive has increased in number from twenty-eight to forty-eight, or over 70 per cent. It is probably generally known that the Executive meets for committee work in the middle of each month; but the approach of the Christmas holidays caused the mid-monthly committees to be deferred until the last Thursday of the year, to be followed by an Executive meeting the next day. This sensible arrangement will save both time and money.

A Sensible Arrangement.

WITH somewhat mixed feelings I read amongst the Executive's correspondence the announcement that the members of the Birmingham Association had decided to offer a very cordial invitation to Conference to meet in the Midland capital at Easter, 1906. I had hoped, personally, that Scarborough's renewed invitation would have been accepted by the Union, without a suspicion of opposition from any quarter. Last year the Scarborough members took their defeat in the best possible part, and before April was out had already decided to "try again." They are keen, capable, and enthusiastic, and would, I am convinced, make the most satisfactory arrangements for every one's comfort. The Yorkshire press is not to be despised, whilst the attractions of Scarborough need no words from me. Although my own vote will go to the northern Queen of the Sea, I must in fairness add that the Birmingham Association is one of the very best in the country, whose members make a huge success of everything they undertake. Is there no possibility of deferring their hearty invitation for another year?

A. C.

The "1906" Conference.

NOTES FROM THE NORTH.

AS I anticipated in last month's notes, the Scotch Education Department has been forced to take some action with regard to the control of the Scottish Training Colleges. On November 18, conferences were held between Sir Henry Craik and the respective Committees of the Church of Scotland and the United Free Church. As the result of these meetings, there is every probability in the very near future of committees of management being formed in each centre for the purpose of dealing with the training of teachers. These will be representative of the universities, the school boards, and the teaching profession. The method of appointing these committees will likely be by the much-maligned minute of the Department. Many are strongly of opinion that the matter is far too important to be dealt with by a minute, but should be effected by legislation. The question of urgency will doubtless be advanced for doing it by minute.

I understand that the Church committees have agreed to the Department's desires. Two conditions, however, they both stipulated. In the first place, they were anxious to see the continuance of the "use and wont" in religious instruction; and in the second place, they wished to safeguard the interests of the present staffs. The question of funds is an important one, and Sir Henry Craik, in his preliminary letter to the committees, pointed out that more funds were available. If this be so, there can be no reason why action should not immediately be taken to remove the present defect and deficiency in the training of teachers.

The Training Colleges.

The Institute and the Question.

AT more than one meeting of the Institute the subject of the training of teachers has been discussed. The Institute has sought to focus the opinions of those interested, and at the same time to emphasise some of the points at issue. It is felt in many quarters that if there is to be an adequate supply of capable and efficient teachers, it is imperative on the State to undertake the control of any scheme of training. The Institute also in various committees has been tackling the question, and it holds very strongly the opinion that the whole system of training should form an integral part of the national system of education. In order that local authorities should take a greater interest in this vital problem, the Institute maintains that they should contribute locally to the finances required for the purpose. This, of course, means that these authorities would have a representation on the Managing Committee. If the Provincial Councils provided for in the Scottish Education Bill are called into existence, it will be part of their work to take much of the responsibility for the supply of teachers. The line of reconstruction proposed by the Institute is very much in accord with the proposed scheme of Provincial Councils. Closer connection with the Universities is much desiderated, and the passing of the University Preliminary, or its equivalent, will form, no doubt, the basis of classification of our future teachers into University and non-University. There cannot be two opinions that at the present time we have not yet reached that stage, but it is and should be the ideal. Facilities might be provided for those who have not reached the standard of the University Preliminary continuing their studies with a view to passing this. The establishment of Faculties of Education in the Scottish Universities will, of course, be a corollary of the closer University connection. How far these ideals will be realised it is impossible to say. But one thing is certain, that a remodelled scheme of training is within possible measure of accomplishment.

* * *

The General Committee of the Institute.

AT various times the composition and size of this committee has been under consideration, but little, if anything, has been done in the matter. This year, however, in view of the great increase in the membership, the subject is likely to receive a considerable impetus. The present unit is 120—in other words, for every 120 members there is appointed to the Committee one member. Taking the membership at 8,000, which if the Institute has not yet reached there is every indication of its doing so before the roll is closed at March 31, we shall have 67 members. If to these be added the six officials, we shall find ourselves with a General Committee of 73 members. Apart altogether from the financial aspect of the question, which is by no means a small one, there is the impossibility of such a large committee doing much Executive work. The result, of course, is that a great deal of the work is delegated to sub-committees, of which the number each year is increasing. Does this state of matters make for effective organisation? I do not believe it does. The question is, of course, complicated in the Institute on account of the number of small branches; but surely a scheme could easily be devised for safeguarding the interests of the smaller branches and at the same time allowing adequate representation to the four or five larger associations. The raising of the unit is but a temporary expedient, and cannot be effective. I should like to see this committee reduced to at least 36. The expenses of the Institute are increasing, while at the same time the work it has to do is also increasing. Much of the money required for this large committee could be more effectively utilised. Each year the Institute should lay aside a sum towards the establishment of a Parliamentary Fund. Until we are represented at St. Stephen's, much of our effort will be useless.

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Death of Mr. James Henderson, M.A.

BY the death of Mr. James Henderson, M.A., headmaster of Whitehill Higher Grade School, Glasgow, there has been removed from the ranks of the profession one of the most prominent workers in the cause of education in Scotland. For many years he was closely identified with the Glasgow branch of the Institute, in which he did excellent work both as a member and an official. In the various committees of the Institute as a whole Mr. Henderson always took an active and enthusiastic part. Last year he was convener of the Education Committee, and there the lofty ideals which he held with regard both to education and to the profession animated and imbued all his colleagues. His loss will be deeply felt by all who came in contact with him. His whole-hearted devotion to his life's work, his professional zeal, his evident sympathy and kindliness of manner, his singleness of purpose, endeared him to the many teachers with whom he laboured. His loss to the Institute is great.

* * *

Underfed Children.

SIR HENRY CRAIK, in dealing with this subject at a meeting in Glasgow, said that the problem of dealing with the great masses of the children, not, perhaps, suffering from any specific disease, but from some reason or other underfed and ill-housed, and living under conditions which were not compatible with health, was looming every day more distinctly and clearly before them. How they were to deal with these was a question for Parliament to consider, but he thought they as citizens might lay down for themselves one or two principles. First of all they must see that they did not diminish parental responsibility. Even for the sake of feeding the children they could not strike at the very root of the manhood and womanhood of our race, and say parents were not to be responsible for those they brought into the world. In the second place, he would earnestly plead for the principle that whatever state system was brought in to do this work, it should not exclude or eliminate the element of personal and voluntary charity. There cannot be any doubt that the former is the greater danger. There is just a possibility that the independence so necessary to the welfare of the nation will be sapped if we neglect to recognise parental responsibility. Already we are taking steps to minimise this, and it would be a serious menace to future citizenship. In Scotland we venture to believe it would be resented even by the parents.

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E.I.S. Doings.

GREAT interest is being evoked in various districts over the nominations for the presidentship and vice-presidentship of the Institute. There is at present only one candidate in the field for the premier honour, but I have reason to believe that in the course of the next few weeks another candidate will be nominated. Aber-

deen has for a third time nominated Mr. J. Mackenzie. Last year he was the first of the unsuccessful candidates, but great hopes are entertained in Aberdeen that this year will see him well in the running. For the vice-presidentship two candidates have been nominated. Mr. Will of Pitsligo has for the second year been nominated. Last year he withdrew, to allow Mr. Dickson, the present vice-president, to have a free field. This will doubtless give him the favour of the younger members. For the first time in the history of the Institute a lady has been nominated for this position. It was exceedingly awkward that the Glasgow Association should require to choose between two lady candidates. Miss Fish, the defeated candidate by twenty-two votes, has done much on behalf of the Institute. She will be remembered by many south of the Tweed as the representative of the Institute at the Buxton Conference. Miss Hamilton, the successful candidate in the branch nomination, has done good work both in the branch and the committees of the Institute. The contest will, in all probability, resolve itself into a fight between the rurals and the ladies of the Institute. The rural teachers of Scotland are strongly of opinion that they need their case represented before the public with a view to more adequate recognition, and as a result they will spare no efforts to secure Mr. Will's nomination. On the other hand, the increasing number of lady teachers joining the Institute is taken as warranting the view that one of their number should aspire to the vice-presidentship. We are promised an interesting contest.

THE Annual Congress of the Institute is this year to be held at Ayr, on the 3rd and 4th of January, 1905. No more suitable centre for a provincial congress could be found. If the preparations that are being made are any guarantee for a successful Congress, there is every hope that Ayr Congress will stand out as one of the most successful we have had. The fact that we are on the eve of important educational changes in Scotland will give the needed fillip to the proceedings. We bespeak a large gathering of teachers for Ayr. With its historical and patriotic associations, Ayr is justly proud of its history, and in the present case it will do all in its power to make its visitors during New Year's week thoroughly welcome. Subjects of great importance are to be treated, and it was hoped that Sir Henry Craik would be present to receive honour at the hands of the Institute. However, I am led to believe that he will be out of the country at that time, and consequently postponement of that function has had to be made.

Ayr Congress.

R. G.

SCHOLARSHIPS FOR LONDON CHILDREN.—A new scheme is being presented by which between 2,000 and 3,000 scholarships will be offered for competition every year. They will be limited to children between eleven and twelve, who are resident in the county of London, and who have attended a public elementary school for at least two years. The scholars will receive free education for at least two years in a secondary school. At the age of fourteen an extension will be granted to a few of exceptional ability, and to others who propose to become pupil teachers. The scholarships will thus be, to a certain extent, marks of honour; and as the limit of parent's income is abolished, they may lead to a recognition of the elementary school as the proper place for children of all classes to receive their elementary education. In addition to free tuition, maintenance grants may be given of £6 and £15 to children of parents earning less than £160 a year.

EDUCATION IN FOREIGN LANDS.

Chile.—One of the deputies of the town of Santiago has introduced into the Chamber a Bill proposing that in every establishment, whether public or private, devoted to primary or secondary education, at least two hours per day shall be devoted to physical exercises; and that in all educational establishments not more than three hours per day shall be given to purely intellectual work, and half an hour to work of a recreative nature. He is supported by many of his fellow-deputies and by influential newspapers in South America. *La Educacion Nacional*, the organ of the Normal School of Santiago, warmly recommends the new departure, and in its August number reproduces in full the speech with which the Bill was introduced.

France.—A French colleague has had the boldness to challenge the constitutional validity of an order from the Minister of Education forbidding teachers to take an active part in politics, and has been successful. M. Gustave Téry, a teacher in Lyons, takes an active part in politics, and spends a great part of his holidays in addressing meetings. He was announced to deliver a political address in Toulon, when his superiors called his attention to the circular referred to. M. Téry answered that he had already addressed fifty political meetings, that he had arranged to address twenty more during his holidays, and would carry out his arrangements. He claimed the right of every citizen to freedom of speech, and refused either to indicate the line he intended to take in politics or to ask permission of any of his official superiors to address political gatherings. For this declaration he was brought before the Conseil Académique, which gave a decision in his favour. The publication of a protest against the treatment to which he had been subjected resulted in his being brought before the highest authority, the Conseil Supérieur de l'Enseignement, which confirmed the decision already given, and thus indirectly condemned the official circular forbidding teachers taking an active part in politics.

Germany.—The town of Charlottenburg has initiated a new and very interesting departure. It has established, as an experiment, a school in the Grünewald forest for weakly and anæmic children. The children it is specially intended to benefit are those who are too sickly to be sent to holiday homes, but not ill enough to be received into hospitals. The school doctor is responsible for selecting the children who are to be received into the forest school. Children suffering from infectious disorders and epileptic and hysteric subjects are excluded. The children leave home as early as possible in the morning, and pass the whole day in the wood. They get from two to two and a half hours' teaching, mainly in the morning. The body is not neglected, for they receive *five meals* in the course of the day. In the afternoon they play or rest in the wood, go through a course of physical exercises in the open air, and receive instruction in manual work. They return home at about seven o'clock in the evening. If the experiment is successful, the school is to be transferred next year on a permanent basis to the Jungfernheide in the People's Park of Charlottenburg.

The new Education Bill in Prussia is exciting lively interest. With the consideration of it are bound up several questions of great importance to Prussian teachers. The confessional, or denominational, school is to remain the ordinary type of school; but where circumstances demand it, *Simultanschulen*, where children of different

religious denominations are instructed, are to be provided. The confessional character of most of the Prussian schools leads to the local minister or priest being *ex officio* the school inspector. Many important pronouncements have lately been made against this system, which has the authority of years of usage behind it. As a compromise it is suggested that the ministers of religion shall no longer be regarded as school inspectors, but shall have the right to sit on the local education committees, and shall be represented by some of their number on the *Schuldeputationen* in the large towns. Many teachers' meetings have pronounced in favour of the Bill, which is largely in the nature of a compromise. As a result of its adoption the teachers trust to see an improvement in the very inadequate salaries they now receive.

Russia.—Much has been said and written lately about the insufficiency of higher education in Russia. Some professors in St. Petersburg have been making investigations, with the object of determining what amount of truth there was in the adverse criticisms referred to. In the course of their investigations they examined about 10,000 petitions and complaints from students preserved in the archives of the University. In no less than 2,875 were gross mistakes in spelling. Almost a half showed a complete ignorance of the rules of punctuation; but the most convincing proof of the grave defects in the previous education of the students of St. Petersburg University lay in the fact that quite a half of the documents showed that the writers could not express themselves with decent correctness in their own language. When it is remembered that all these complaints and requests had to be drawn up according to a prescribed form, and that the composers might be naturally expected to take all possible trouble over the documents they sent in, the conclusion is irresistible that higher education in Russia leaves very much to be desired.

But if Russia generally takes one of the lowest positions among European nations with regard to education, there is one province which forms an exception to the general rule. The Grand-Duchy of Finland enjoys the distinction of being that part of Europe which spends the largest sum per pupil on elementary education. It spends three times as much as Germany, and two and a half times as much as England, per pupil. A recent contribution to the *Practical Teacher* has supplied proof of the esteem in which education is held in this ill-used land. Swedish influence in Finland has caused the question of the co-education of the sexes to receive considerable attention. The first mixed school was opened in Finland in the eighties. The idea was not favourably received at first, but in about ten years there were forty-five such schools—a considerable number for so sparsely-peopled a country.

Uruguay.—In Uruguay compulsory education is decreed by law; but like many another good law, it does not command the obedience it should. Hardly 6 per cent. of the population is enrolled in the public elementary schools, as against 17·45 in England and 18·08 in Germany. The school course is divided into seven years of instruction, but the majority of the scholars take themselves off after getting through the three junior courses. Thus in 1901, while the total number of pupils of the first three years of instruction was 49,814, only 5,562 remained for the four advanced years. The complaint which the friends of education make in Uruguay is not so much that there is absolute illiteracy, as that the majority of the people possess only the barest rudiments of education.

Japan.—Among the factors which count for much in the position which Japan almost at a bound has taken amongst the nations of the world must be counted its educational development during recent years. Since 1871 a ministry of public education has existed, and schools have been organised on the model of those existing in England, France, and Germany. The best European works on pedagogy have been translated into Japanese, and no less than 30,000 public elementary schools have been founded. Besides these, there exist 172 schools for secondary and higher education, of which 23 are for girls. In addition to 47 training colleges for teachers, there are many schools of art, technical, commercial, and agricultural schools.

But there is a dark side to the picture of progress. Japan, in copying the West, has copied many of its faults. The enormous industrial development which has been the work of the last ten years has resulted in a great employment of child labour at exceedingly low wages. In the match factories of Osaka, children of from six to eight years of age are employed for six hours a day. The Government is alive to the physical and social evils entailed by the employment of very young children in factories, but the industrial difficulties due to the war now raging have led to the postponement for a time of the Bill which has been prepared for diminishing these evils.

"ASSISTANTS ANGLAIS EN FRANCE."

BY "ONE OF THEM."

THE scheme whereby British teachers and students in training were admitted to lycées and colleges in France as "assistants anglais" was initiated this year, and in April last six British students left in company to fill such positions in French lycées, chiefly in Central and Eastern France. As the Education Department in August last issued a circular drawing attention to the formation of this scheme, some details of personal experience in such a position before it was regularly instituted might not be uninteresting.

The school to which the present writer was attached was a lycée—that is, the highest type of French secondary school. As I was the first "assistant anglais," I was regarded as a person whose functions required a good deal of justification to official—that is to say, French official—minds. The headmaster, too, was a "classical" man, and viewed English as it is often viewed in France—as French is regarded in our own country. For if we show our appreciation of French by employing as teachers the maimed, the halt, and the blind, metaphorically speaking, the French regard our language, partly from custom, but chiefly for political and geographical reasons, as below German as an educational instrument.

The lycée, however, boasted a fine English master, a Frenchman, best summed up in the words "scholar and gentleman." Under his care I was duly introduced to his classes, and half an hour's listening to a lesson and ten minutes' chat with the boys at the end of it satisfied me that my place would be agreeable. For there was in the boys' eyes that look of intelligent interest which satisfies every teacher.

This introduction over, I was introduced to the chamberlain (*économe*), who escorted me to my room. I found I was housed in the infirmary, a large building completely detached from the school. There were, of course, no serious cases there, and it was a kindness to place me in a building where I might be of and yet not in the school. For this building stood in the midst of a lovely garden, where bloomed the acacia and other sweet-smelling trees, and where the nightingale piped her song night and day. Here the nuns, the nurses of the establishment, paced to and fro, bringing a sense of harmony and peace, remote from school worries and cares.

Thus settled, I was next led off to dinner. I found I had to dine with the ushers (*répétiteurs*). Merry fellows they were too, and I was not long in feeling at home among them. Helpful, too, were they in smilingly correcting slips in the French of the "assistant anglais," though too polite to make what must have been his atrocious accent a common laughing matter. Afterwards, as we came to know each other better, all kinds of discussions cropped up. Politics had their share; for though the assistant in English is expressly forbidden to talk on religious or political subjects to the boys, his freedom could scarcely be curbed in private. Here socialism and republicanism reigned supreme, and many a hot debate ensued, to which a walk in the moonlit courts brought a peaceful end.

But to return to first day experiences. There was yet to be the interview with the headmaster. My French, British taught, was not of the best for such interviews, and only afterwards I found the blunders I had made as I unconsciously complimented myself or otherwise in answering "Oui, monsieur," to every half-understood question. The rules were read over by the *proviseur* (headmaster), in whose buttonhole was fixed that little red ribbon which denotes the Order of the Legion of Honour. For even so are headmasters of this democratic country decorated. I was not to take "any part in the regular instruction of the pupils," but was to be "regarded in all other respects as the colleague of the *professeurs*."

My main duty was to conduct small "conversation groups" of five or six pupils. It was specially emphasised that these conversations were "to be made as little formal as possible." There was to be nothing like a set lesson, but the pupils were to be induced "to talk rapidly on subjects within their grasp in a manner which is not possible in the classroom." So, starting on the principle of proceeding "from the known to the unknown," we began conversation on the life of a French lycée. I received as well as gave instruction. Then the boys questioned me on boys' school life in my own country, what games they played, etc. From such a centre we radiated, finally embracing national games and sports, fêtes, institutions, government, life, and manners. These conversations were seldom strained, though occasionally with the younger boys the conversational ability was naturally less. Sometimes their scope was limited by the comparatively narrow range of a French boy's sympathies, circumscribed as they are by the strictly-disciplined life they lead. Participation in the boys' games also introduced a fresh means of conversation. I even started a cricket club ("an optional duty," as the circular truly says), and the walls of the lycée rang with the unwonted sound of a cricket ball striking improvised wickets. Unfortunately, our ardour abated when the abnormal temperature of 95° in the shade and 140° in the sun was reached. Still, should any reader of this sketch be tempted to cross the Channel to fill such a position, a cricket bat or tennis racquet would be a good investment as a part of his (or her) luggage. For though these remarks apply to a boys' lycée, they equally apply, as I know from others of our party, to girls' lycées.

I can imagine a good number of questions arising, however, in the mind of a candidate for such a position. "Is the board and lodging—the only remuneration for such services—good? Are your energies limited to a lycée? What social intercourse outside school is open to the assistant in English?"

To all such questions a number of replies would be given, according to the experience of each. In answer to the first question here is a menu :—

Menu du Lycée.

Du lundi 16 au dimanche 22 mai 1904.

Jours.	Dejeuner (7.15 a.m.).	Diner (11.30 a.m.).	Souper (7.30 p.m.).
Lundi.	Café au lait.	S. (soupe) oiseille. Veau et choux fleurs. Pommes de terre frites.	Mouton et haricots. Crême à la vanille.
Mardi.		S. oig. Biftecks et jardinière. Asperges à l'huile.	Veau en blanquette. Pommes de terre au gratin.
Mercredi.		S. jul. Rosbif. Haricots sautés.	Veau et nouilles. Salade et œufs.
Jeudi.		S. lég. Porc froid au gelée. Veau et petits pois.	Bœuf braisé aux pommes. Gateaux de riz au rhum.
Vendredi.		S. au lait. Chou au salade. Pommes sautées. Confitures.	Omelettes fines herbes. Haricots au beurre.
Samedi.		S. purée. Biftecks. Pommes de terre frites.	Veau et lentilles. Gruyère.
Dimanche.		S. jul. Vol au vent. Escalopes de veau et pommes. Gateaux. Vin blanc.	Rosbif et haricots. Salade et œufs.

Presénté par l'Economne. (Sgd.) B——. Approuvé par le Médecin. (Sgd.) H——. Arrêté par le Proviseur. (Sgd.) B——.

For the actual cooking, French cookery is at stake. The *vin blanc* shows a fête day—in this case, that of Pentecôte or Whitsuntide. The 14th of July was another, and the toast of France was as duly honoured by the "assistant anglais" as that of his own country by his French comrades.

The strict discipline of a French lycée may at first interfere slightly with the liberty of the assistant in English. The mere fact that he is a student makes it, in French eyes, an open question whether or not he is *sérieux*. But a week or two will soon show the *proviseur*, with whom he has to deal, and the "assistant anglais" has privileges which the ushers sigh for in vain.

For the assistant in English is also an official, and as such has a position which stands him in good stead in the land of officials. His status is a good one; his rank is what he makes it. Should he find himself in a town where social life includes some of British birth, he will find a ready welcome not only in these homes, but in the proverbially hospitable houses of the French. Apart from the mere benefit of the study of the language, he will have a favourable chance of seeing French life, especially school life, from within. Politics in municipal or parliamentary elections, religion as in the first com-

munion service in the school chapel, manners in school and town and market—all come home to him as they would not do if he were a strictly private student.

The benefit, therefore, accruing from such a stay can hardly be exaggerated, and the Departmental action in this matter deserves all praise. Its circular invites "candidates, preferably graduates of some British university, to forward their applications, enclosing testimonials as to character, capacity, and teaching experience, as well as a medical certificate of health." After an interview with an officer of the Department at some suitable place (Edinburgh and Glasgow for Scottish students), application is made on the candidate's behalf to the French minister.

Only one movement could be better than this, and that would be the establishment throughout Great Britain of the institution of "assistants français." Happily another circular of the Department announces that it is willing, under the same conditions, to find native assistants in French for such headmasters as are willing to give board and lodging or equivalent salary. It is to be hoped that such reciprocal action will find a hearty response on the part of our directors, say of pupil-teacher centres and training colleges, for any reciprocity in this matter will help forward a movement already well initiated.

A Frenchman dwelling on such a scheme sees in it a drawing closer the union between France and Britain, to which schemes like international correspondence and exchange of schoolboys have already tended. The Briton is less idealistic; but who will deny the justice of such a view, or limit the influence this must have on teachers and pupils alike?

SCHOOL SLANG.

"THE blessed word Mesopotamia" expresses a common feeling. There is in most people a power of enjoying certain words merely as sounds, altogether apart from any associations connected with them which enhance their attractiveness. It is this enjoyment of words as sounds which lies at the root of poetry as an art, so far as its music is concerned. The principle goes deeper still, and is one of the agencies at work in the making of language. In obedience to it have appeared the onomatopoetic words which enrich our mother tongue, and which strike us as being so "pithy" and "descriptive."

Children have their "blessed words" as well as older people, and a recent inquiry into this phase of children's interests made by a writer in the *Pedagogical Seminary* brings out the great generality, almost the universality, of the fact. Some words are liked because they "sound pretty," others because they "sound queer." *Antediluvian, carmine, Constantinople, paraphernalia, Minnehaha, ornithorhynchus, rhododendron,* and *incarnadine* may be selected from the list of words given to illustrate the former class; *caterpillar, Deuteronomy, ecclesiastical, heliotrope, lackadaisical, salamander,* and *Yangtse-kiang,* the latter class. Thus far we are dealing with a tendency which apparently makes for literary appreciation. But we also find as favourites, for precisely similar reasons, words such as *quazy-wazy, scat, skedaddle, scrumptious, wiggle-waggle,* and *superlabgabscious.* So the tendency is evidently one which may induce the formation of a vocabulary somewhat wider than is recognised in "Webster's unabridged." In other words, it is one of the origins of what we are pleased to call slang.

One of the most powerful devices of language is the transference of words and phrases from their literal meaning as used in one sphere into another sphere where they can be used in only a metaphorical or pictorial sense. Metaphor has been called fossilised poetry, and poetry depends for much of its effect upon the use of metaphor. We need not quote; the text-book examples, at least, will occur to all. We rather try to exemplify how narrow is the boundary which here divides the poetical and the legitimate from the forbidden and the slangy.

The respectable writer may speak of the "swelling heart," but the "swelled head" is taboo. Bacon (he of St. Albans, not of Stratford) speaks of one who is "the only figure among ciphers." The schoolboy alone dares to tell a friend that he is "not the only cat on the fence," though he may think himself "the biggest toad in the puddle." Even a teacher may say, "Hold your tongue," when he wishes silence; as an actual picture of physical action one might prefer the boy's order, "Hold your jaw," or "Close your face;" but the first is a proper and recognised form of speech, while the two last are unadulterated slang. It is permissible to use a military phrase and say, "Call a halt;" but if we borrow a phrase from the humble domestic telephone and say, "Ring off," we are in danger of condemnation. "As merry as a marriage bell" is poetical; "more fun than a cat-fight" is not, though equally suggestive as a simile. You may "stake your reputation" in polite society, but you must not "bet your boots," to say nothing of "your bottom dollar." To describe a smile as "broad" is permitted; to attempt greater precision of measurement by calling it "a smile 4 by 10" is forbidden. One may borrow from the ancient game of chess to any extent, and speak of "pawns" and "checkmate;" but only on the pain of becoming slangy may he use the phrases of the more familiar poker (to speak with a transatlantic reference), and "bluff" or "pass in his chips," as the case may be.

There is here a close analogy, it will be seen, with the conventions which determine what kind of parcel one may carry along the street respectably, and what must be sent home by a messenger. The contents of the game-bag or the fishing-basket come under the former category; the joint from the butcher or the vegetables from the greengrocer under the latter. And it is not entirely a matter of distinction between what is purchased and what is not; otherwise one might carry home a new book at as dire social peril as a new hat. The distinction lies much deeper—so deep that we decline to work down to it.

The pertinent fact is that as an unenlightened man may carry home a hat which he has newly purchased but does not require for immediate use, and not incur any real moral condemnation, so there may be a use of what is called slang without any moral depravity on the part of the user. Just where the line falls between picturesque language which is excusable and that which is taboo is the question which seems most difficult to decide. Proceeding, therefore, on the good old principle of "looking the difficulty in the face and then—passing on," we leave it for decision by some competent authority.

There is an educational lesson underlying the prevalence of school slang. It is this, that the adoption of a slang word or phrase is a mark of the same kind of

interest in language which under other conditions leads to the formation of literary style.

We may detect three causes at work in the use of slang. There is first the choice of a word because it is of a striking or a pleasing sound; next there is the case of a word adopted on account of the vivid metaphor it embodies; and finally we must recognise the influence of fashion, or the adoption of words which are used by persons regarded as worthy of imitation. Of these three causes of slang, we may note that the two first are those which lead to the poet's choice of language, while the third is operative in all attempts to form a good prose style by the study and imitation of the masters. Whatever we may think of the result, therefore, the mental processes at work in the use of slang are at least respectable.

Some quotations given in the article which has suggested the present paper bear out this view very strongly. "Slang is an attempt of common humanity to escape from bald literalism and express itself illimitably, which in highest walks produces poets and poems;" and "Daring as it is to say so, in the growth of language it is certain that the retrospect of slang from the start would be the recalling from their nebulous conditions of all that is poetical in the stores of human utterance" (Whitman). "There is death in the dictionary; and where language is too strictly limited by convention, the ground for expression to grow is limited also, and we get a potted literature—Chinese dwarfs instead of healthy trees" (Lowell). "Slang is an effort on the part of the users of language to say something more vividly, strongly, concisely, than the language existing permits it to be said. It is the source from which the decaying energies of speech are constantly refreshed" (Lounsbury). "Slang is language in the making" (Emerson). Such views of slang are, of course, quite incompatible with those recently enunciated by Mr. Wells in his tirades against our teaching of English, in *Mankind in the Making;* but they are none the worse on that account, rather the reverse.

And now the moral? We propose to spare our readers as much as possible, and will not enlarge; but it seems evident that the age at which slang most commonly becomes popular is also the age when a boy's appreciation of literary style, using the term in a very elementary sense, is beginning to awake. If he can appreciate a terse slang expression with a certain artistic pleasure, he may be expected also to appreciate phrases of a similar character in his literary lessons. In short, we ought to regard slang as something which meets, or at least indicates, a "felt want," and we ought also to meet this natural craving with still better literary material, if we can. In any case, slang seems to be a phenomenon which falls within the literary and æsthetic sphere rather than within the moral, and it ought to be treated accordingly.

THE POINT OF VIEW IN ILLUSTRATION.

PERHAPS the most important consideration in connection with the application of illustration in teaching is the point of view from which it is to be presented. This is equally important whether the matter be viewed from the standpoint of the verbal illustration or the concrete illustration.

In Rousseau's *Emile* we have an excellent example of the importance of this consideration in connection with moral instruction. Of all writings in the world, there are few to be compared in the popular judgment with the fables of Æsop as material for moral instruction. Locke, in fact, goes so far in his *Thoughts* as to give the judgment, "The fables of Æsop, the only book almost that I know fit for children." It is rather startling, therefore, to find that Rousseau makes an excellent case against fables. He points out that the child will inevitably put himself in the place of the winning character in the story, and not in that of the person or animal who represents morality. It is true that Rousseau takes as his text not Æsop but La Fontaine, who, as everybody knows, is still the great moralist for the young in France. Children of the tenderest years are taught his fables by heart, and as they repeat them and lisp the moral at the end, parents and teachers are quite convinced that much good has been done and important lessons learned. The case against fables is certainly not weakened, therefore, by accepting La Fontaine instead of Æsop.

Rousseau's attack is not confined to the moral side, however; for among other paradoxes he maintains that fables, so far from being the very material that children should study, are just the sort of thing that children cannot understand. To support his position he selects the well-known fable of "The Fox and the Crow." He chooses this example because he thinks it is fairest to La Fontaine. Rousseau himself gives the following reasons for choosing this fable:—

"Because children take to it most; because they learn it with most pleasure; because it is the one that the author himself has placed by preference at the head of his book. Supposing its object to be to reach the children's understanding, to please and to instruct them, this fable is certainly his masterpiece. Let me then follow it out and examine it in a few words."

To follow the criticism it is necessary to have before us a translation of the fable; and as this translation must for purposes of reference correspond line for line with the criticism, I must, however little the Muses love me, make a translation for myself.

THE FOX AND THE CROW.

On tree-top perched sat Master Crow,
Within his beak he held a cheese;
The scent led Master Fox below,
Who him addressed in words like these:—
"Ha! good-day, good-day, dear Sir Crow;
How fair you are! how do your looks me please!
Without a lie, if but your note
Matches at all your beauteous coat,
You are the phenix 'mongst the woodland train."
These words with joy nigh turned the crow's weak brain;
And to display his dulcet strain
He opes his beak—down falls the cheese amain.
The fox enjoyed the cheese, then said, "Good sir,
Now learn that every flatterer
Lives upon him his flatt'ries please:
A lesson this no doubt well worth a cheese."
Confounded and ashamed, the crow
Swore, somewhat late, none else should have him so.

CRITICISM BY ROUSSEAU.

On tree-top perched sat Master Crow.

Master. What is the meaning of this word in itself? What does it mean before a proper name?

What meaning has it here? What is a crow? What is the meaning of "on tree-top perched"? We do not say "on tree-top perched," but perched on a tree-top. Consequently we must speak of poetical inversions. We must tell what prose is, and verse.

Within his beak he held a cheese.

What cheese? Was it Swiss, Brie, or Dutch? If the child has never seen a crow, what do you gain by speaking to him of it? If he has seen one, how can he imagine it holding a cheese in its beak? Let us always make our illustrations agree with nature.

The scent led Master Fox below.

Another "master," but this time by good right. He is past master in all the tricks of his trade. We must tell what a fox is, and distinguish his true nature from the conventional character which he has in fables.

Led by the scent of a cheese.

This cheese held by a crow perched upon a tree-top must have had a powerful smell to be perceived by the fox in a thicket or in a burrow. Is it thus that you exercise your pupil in the spirit of well-balanced criticism, which only allows itself to be imposed upon under suitable artistic conditions, and can discriminate between truth and lying in the tales of another?

Who him addressed in words like these.

Words! Foxes speak then? They speak the same language as crows? Wise instructor, be careful. Weigh well your reply before making it; it means more than you think.

Ha! good-day, good-day, dear Sir Crow.

Sir! A title which the child sees turned into ridicule even before he knows that it is a title of honour. Those who say *Sir* Crow will have plenty to do before they explain this *Sir*.

How fair you are! how do your looks me please!

Padding, useless repetition. The child seeing the same thing repeated in different terms learns to speak slovenly. If you say that this redundancy is an art of the author, that it enters into the plan of the fox, who wants to appear to multiply praises with words, that excuse will do for me, but not for my pupil.

Without a lie, if but your note.

Without a lie! People lie then, sometimes. What can the child think if you explain to him that the fox only said "without a lie" because he was lying?

Matches at all your beauteous coat.

Matches! What does this word mean? Teach the child to compare things so different as voice and plumage: you will see how he will understand you.

You are the phenix 'mongst the woodland train.

The phenix! What is a phenix? Here we are all at once thrown into the fictions of antiquity, almost into mythology.

The woodland train! What figurative speech! The flatterer ennobles his speech and gives it more dignity in order to render it more seductive. Will a child understand this delicate policy? Does he ever know—*can* he know—what a noble or a low style is?

These words with joy nigh turned the crow's weak brain.

One must have already experienced very keen passions to understand this proverbial expression.

And to display his dulcet strain.

Do not forget that to understand this verse and all the fable the child must know what the dulcet strains of a crow are.

He opes his beak—down falls the chêese amain.

This line is admirable. The very harmony makes a picture of it. I see a big, ugly open beak. I hear the cheese falling through the branches. But beauties like these are lost on children.

*Opes.** This word is out of ordinary use. It must be explained. One must say that it is only used in verse. The child will ask why people speak differently in prose and in verse. What will you answer him?

The fox enjoyed the cheese, then said, "Good sir."

Here we have, then, already goodness turned into vileness. Certainly the tree of knowledge is an early plant in our children's garden.

Now learn that every flatterer.

General statement: we are quite beyond our depth.

Lives upon him his flatt'ries please.

No child of ten will ever understand that line.

A lesson this no doubt well worth a cheese.

That is true, and the thought is very good. Yet there will be found very few children who can compare a lesson to a cheese, and who would not prefer the cheese to the lesson. We must get them to understand, then, that this remark is only a joke. What fine-drawn distinctions for children!

Confounded and ashamed, the crow.

Another pleonasm; but this one is unpardonable.

Swore, somewhat late, none else should have him so.

Swore! What sort of blockhead is the master who dares to explain to a child what an oath is?

Here we have abundance of details, yet not so many as would be necessary to analyse all the ideas of this fable, and to reduce them to the simple and elementary ideas of which each of them is composed. But who believes that there is need of this analysis to make oneself understood by the young? None of us is philosopher enough to put himself in the place of a child.

Let us pass now to the moral. I ask if it is to children of six that we should teach that there are men who flatter and lie for their profit. One might at most teach them that there are mockers who make fun of little boys and laugh in their sleeve at silly boyish vanity; but the cheese spoils everything. One teaches them not so much not to drop the cheese from their own mouths as to make it drop from the mouth of another. Here, then, is my second paradox, and it is not the least important.

Observe children learning their fables, and you will see that when they are in a position to apply them they almost always do it in a way contrary to the intention of the author, and that instead of guarding themselves against the vice of which we wish to cure or from which we wish to protect them, they are inclined to love the vice by means of which one makes profit out of the failings of others. In the preceding fable children laugh at the crow, but they have all a warm side towards the fox. In the following fable you think you are giving them the grasshopper as an example. Not at all. It is the ant that they will choose. One does not like to eat humble pie. They will always play the grand part. It is the choice of self-love, a most natural choice. But what a ghastly lesson for childhood! The most hateful of all monsters would be a hard and miserly child, knowing what was asked of him, yet refusing. The ant does more: she teaches the child to chaff while refusing.

In all the fables where the lion is one of the characters,

* In the original this note applies to the word *alléché*, but the general sense is not at all changed by transferring the remarks to the poetical form *opes*.

since he is the most distinguished the child never fails to make himself the lion; and when he superintends distribution, well taught by his model, he is most careful to seize everything. But when the gnat gets the better of the lion, that's another affair: then the child is no longer the lion, he is the gnat. He learns to kill one day by needle-thrusts those whom he dare not attack in a stand-up fight.

In the fable of the lean wolf and the fat dog, in place of the lesson in moderation which is intended to be conveyed, he takes a lesson in licence. I shall never forget seeing a little girl weep copiously because she was being taught docility by means of this fable. Her friends could not understand the cause of her tears. At length they learned. She felt galled like the dog: she wept because she was not the wolf.

Thus, then, the moral of the first fable quoted is for the child a lesson in the basest flattery; that of the second a lesson in inhumanity; that of the third a lesson in injustice; that of the fourth a lesson in satire; that of the fifth a lesson in independence.

While there is a certain amount of instruction for the teacher in the cleverly-arranged statement of the difficulties of understanding the matter of the fable, the criticism of this aspect of fable teaching is unsound. Clearly the same sort of objection could be brought to bear upon any means of communicating with young people through a literary medium. The mere difficulty of understanding the text does not arise because the text is a fable, and therefore we confine ourselves to the moral aspect, as that is the only part of the criticism that is specially applicable to the fable as a fable. That there is a great deal of truth in Rousseau's contention cannot be denied. We have the same thing illustrated in a somewhat different way in our own adult experience of reading novels. Sometimes the author takes it upon him to keep us for several chapters in the company of the villain and his friends. Gradually we begin unconsciously to look at things from the villain's standpoint. There is, of course, no real moral harm done; it is only a matter of tone. But the effect is quite perceptible. By-and-by, when some virtuous person in the story comes along and interferes with the villain's plans, we feel a distinct if momentary annoyance.

The following case is from my own experience. In certain classes in school the composition lesson takes the form of telling the class a story, and requiring the children to reproduce it in their own words. This particular story is reproduced exactly as it left the hands of a very dull boy of twelve.

"A good man who was going along the Ganges. He saw a tiger. The tiger was going to jump. So the man did not know what to do. So he went down to prayed. So the tiger it jumped, and the man was down to pray. And the tiger missed the man. But a krokidile opened its mouth. And the tiger was eat up and the man was saved. Moral—*Look before you leap.*"

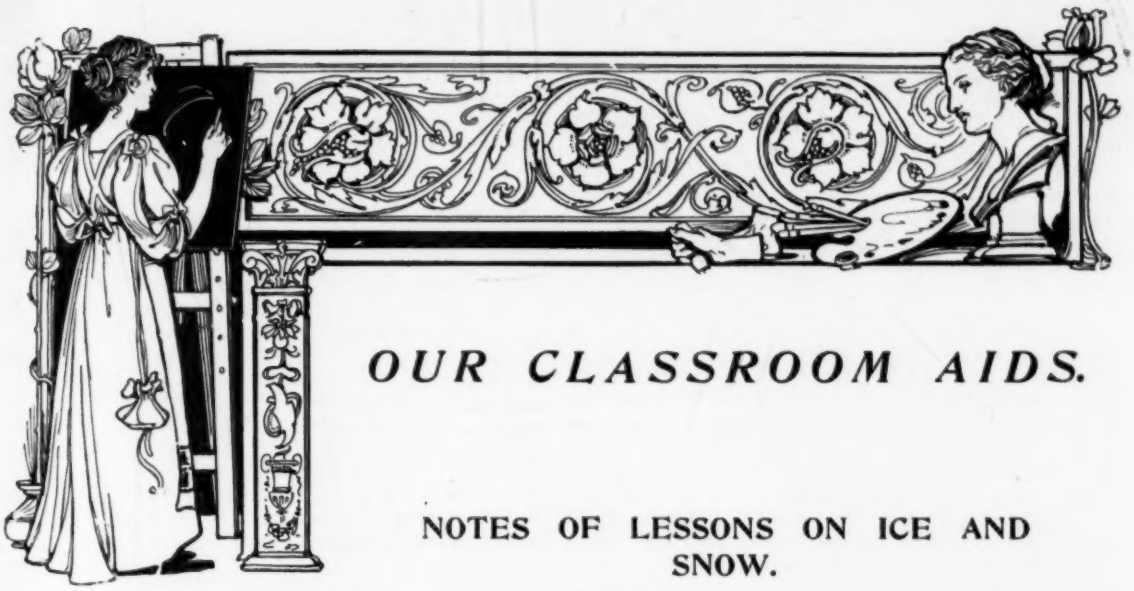
The moral was not asked for, and the boy was too stupid to think of making a joke. He merely made the mistake of regarding the transaction from the tiger's point of view.

Before quitting the moral question, we should note that there is cause for comfort as well as for concern in Rousseau's exposition of the childish tendency to misapply moral illustrations. It cannot be denied that we are all, whether children or adults, strongly inclined to be self-referent in our interpretation of all illustration that deals with persons. It must be admitted that we have all a tendency to put ourselves in the place of those about whom we are reading, but this very tendency may be used with advantage by the skilful teacher, who is often thus enabled to give a boy a lesson without even referring either to the boy or to the particular cause which leads to the necessity of this lesson. The master who finds a boy in need of special guidance on some moral point, and who has ingenuity enough to discover an instructive parallel to the boy's circumstances, may be sure that the boy's natural tendency to self-reference will bring about a personal application, and that in the most effective way, because the application is suggested from within and not imposed from without.

In the more practical parts of our teaching—the parts that may be called the *comme ça* parts, those in which imitation is mainly relied upon—the point of view is equally important. In the various exercises in which the teacher shows the pupils by example exactly what they are to do, there is one special form of confusion that arises from the difference in the point of view. This is the distinction between right and left. Perhaps you may have noticed the very common confusion in ordinary life between the two hands as a means of direction. Every stranger who asks his way in London has soon very convincing evidence of the prevalence of this confusion. It is always well to test every direction at each turning. For "third turning to the right" we have very frequently to read "third turning to the left." This arises partly from the inevitable confusion between two directly opposed directions. We have the same thing to a less degree between east and west, but not nearly so frequently between north and south. We cannot go into the details of the difference, but there can be little doubt that east and west share their bad pre-eminence with right and left because they are usually correlated to right and left on the map.

The fact that you and the policeman stand facing each other has to be taken into account in your estimate of the source of error. Your right and his left have a disturbing resemblance. This difficulty is usually met, in actual teaching, by adopting the same direction as the pupils. The drill master and the sewing mistress stand in front of the class with the back towards the pupils, and do the best possible under the circumstances. The position is awkward for both teacher and pupils, but it is found to be on the whole the best way out of an impossible situation. An alternative is to stand in front of the class, and then give the demonstration with the reversed arms—that is, the teacher uses the right arm when he wishes the pupil to use the left, and *vice versâ*. This naturally requires special training on the part of the teacher.

The same difficulty appears in dealing with diagrams, particularly physiological diagrams. When we talk about the right side of the dissected rabbit, we are not sure from the diagram whether we mean the right side of the drawing or of the thing represented. The usual rule is that the drawing is to be understood in the reverse sense from that in which it is drawn—that is, the right of the drawing means the left of the real rabbit. The cause of this is that the diagrams are usually made from an actual dissection, as it lies upon a table. If the convenience of the dissector is to be mainly considered, this will remain the usual form. In this case the only thing to be done is to make the rule invariable. Some books lead to endless confusion because some of the diagrams are drawn in the one way, and some in the other.



OUR CLASSROOM AIDS.

NOTES OF LESSONS ON ICE AND SNOW.

Class.—Suitable for the upper standards of either urban or rural schools.

Time.—Three or four lessons of half an hour each.

Object.—To familiarise the children with these natural phenomena, and to indicate the part played by ice and snow in the economy of Nature, and thus to lead them to realise that everything serves some useful end, even those things that may affect us personally in an unpleasant manner.

Step I. Preparation.—Let the children give expression to their own ideas on the subject of ice and snow in a composition exercise, either written or oral, and it will probably be found that the majority of these ideas will centre round the following points—(1) the beauty of the snow; (2) the fun that strong, healthy children have in the snow; (3) some may speak from bitter experience of the stoppage of many branches of labour by the frost, and of the hardships and sufferings that ensue. Having discussed these aspects of the subject, the conclusion arrived at would probably be that the disadvantages of the frost quite outweigh its benefits; the next step, therefore, is to present new ideas on the subject, to enable the child to see that ice and snow are Nature's handmaidens, performing useful work for her.

Step II. Presentation. 1. *The Three States of Matter.*—If elementary science is not taken in the school, it would be advisable to have a few words on the three states of matter, and to show by means of pitch, sealing-wax, lead, etc., that solids can be converted to liquids by the application of heat, and that these liquids revert to the solid state on cooling. In the case of water, this act of changing from the liquid to the solid state is known as freezing.

2. *Why Ice forms on the Surface of Water.*—Take a cylindrical tin can having a troughlike shelf round the middle, and two thermometers inserted at the side, one near the top and the other near the bottom. Fill the can with water, and place powdered ice and salt in the trough, so that the water in the middle of the tin is cooled. As this water cools it will contract, and becoming more dense will sink to the bottom; so the thermometer at the bottom will show a lower temperature than the one at the top. This is the usual condition of a body of water, and evidently if it continued right down to freezing-point the ice would form at the bottom. Fortunately for us it is not so; for when the lower thermometer indicates 4° C. it will remain stationary, and soon both thermometers will register the same temperature. After this the upper thermometer marks the lower temperature until freezing-point is reached, when a thin film of ice is formed on the top. Hence we see that below 4° C. water proves an exception to the general law that bodies expand when heated and contract on cooling, for here the water expands as it cools.

3. *Why Ice Floats.*—If we place a piece of ice in water we find that it floats, showing that its density is less than that of water—that is to say, a cubic foot of water will make more than a cubic foot of ice. In fact, when water freezes it suddenly expands about one-tenth of its volume, and hence becomes bulk for bulk lighter than water. Some idea of the force with which water expands on freezing can be given by means of a small cast-iron bottle fitted with a screw stopper, which can be purchased for a few pence. If the bottle is filled with water and placed in a freezing mixture, the water will expand with such force when it freezes that the iron bottle will be fractured. One result of this expansion on freezing is seen in the bursting of water-pipes during frosty weather, and the cracking of jugs and basins which are left with water in them; but these are only trifling matters compared with the far-reaching results that we shall have to consider in the world around us.

4. *Snow.*—Snow is formed by the freezing of atmospheric moisture. Usually this moisture condenses into drops of water, which fall as rain; but if the temperature falls below freezing-point, the moisture will freeze into flakes, each consisting of a number of symmetrical six-rayed crystals. Most of these beautiful forms get broken as the snow falls through the air; but if a few flakes are caught and viewed through a magnifying-glass, the starlike shape of many of them can still be distinguished. The whiteness of snow is due to the fact that although it is composed of particles of transparent ice, each of these ice-crystals reflects a little light, the total result being that all the light is reflected, and the snow appears white and opaque. Snowflakes contain about nine times their own volume

of air entangled among the particles, so that a fall of ten inches of snow is equivalent to a fall of about an inch of rain. This loose texture of the snow makes it a very bad conductor of heat, so that a covering of snow serves as a blanket to the earth, and protects the plants from the frost. This can be proved by placing a self-registering thermometer on the snow and another one beneath the snow, when it will be found that the latter registers a higher temperature than the former.

Step III. Association.—1. We have seen that below 4° C. water behaves in an exceptional manner, and expands as it cools. The importance of this remarkable behaviour cannot be overestimated, for were it otherwise this globe would soon be uninhabitable: the coldest water would continue to go to the bottom until freezing-point was reached; consequently the ice would form at the bottom of rivers, lakes, and seas. Now, as water is a bad conductor of heat, the heat even of the summer sun fails to reach the bottom of the rivers and seas; consequently if the ice formed at the bottom, the sun would be unable to melt it, and each succeeding winter would increase the thickness of the ice, until in course of time the oceans would become solid masses of ice during the winter, a few inches being converted into a shallow layer of water during the summer. This can be illustrated very effectively by the following experiment. Fasten a piece of ice to a sinker, so that when placed in a test-tube of water it will remain at the bottom; now hold the upper part of the test-tube in the flame of a bunsen burner until the water boils. Then we shall see that we can have boiling water at the top of the tube and ice at the bottom.

2. We have shown that when water freezes it expands, often causing us great inconvenience from broken water-pipes, etc.; but now let us take a wider view, and find what part frost plays in the great scheme of nature. Frost is one of the most powerful agents in the disintegration of rocks, by which stony masses which are quite useless for cultivation are broken up into fine particles which form the basis of rich arable land. If a rock is at all porous, the rain will soak into it, filling up the pores and percolating through the tiny crevices; when this water freezes, it will expand sufficiently to loosen the particles of rock, and thus very materially help on the work of disintegration. Similarly the frost will loosen the soil around the roots of the trees, the beneficial results of which are subsequently seen, for we generally find that a hard winter is followed by a good fruit harvest. The farmer, too, avails himself of the assistance of the frost when he ploughs his land at the fall of the year and leaves the frost to break up the clods.

3. *Glaciers, etc.*—Some mountains are so high that their peaks are in the region of perpetual snow—that is to say, the heat of summer is not sufficient to melt the snows of winter. The result is, of course, an accumulation of snow on the mountain top, which gets compressed into solid ice by its own weight. This mass of ice glides slowly down the mountain side, and is known as a *glacier*. Sometimes a mass of ice and snow will become detached from a glacier, and will rush precipitously down the mountain side, often doing a great amount of damage: this is an *avalanche*. In the polar regions the snow-line reaches to the sea-level, so that the glaciers will glide unmelted down to the seashore, and will gradually protrude a mass of ice into the water. The buoyancy of ice will finally cause it to snap off from the glacier, and this immense mass of ice will float away as an *iceberg*.

Step IV. Formulation.—1. When water changes from the liquid to the solid state, it is said to freeze.

2. As water cools it contracts until it reaches 4° C., after which it expands, so that ice forms at the top. If the ice formed at the bottom, the oceans would become masses of ice.

3. When water freezes it expands one-tenth of its bulk. This expansion is a powerful agent in disintegrating rocks; it also loosens the soil for the farmer.

4. Snow consists of six-rayed crystals. It is a bad conductor of heat, and so serves as a blanket to protect plants, etc., from the effects of the frost.

The accumulation of snow on the mountain tops gives rise to glaciers, avalanches, and icebergs.

Step V. Application.—We have already seen the practical application that the farmer makes of the knowledge imparted in this lesson; but the best application will be of a moral rather than a practical nature, for it will lead the children to see that there is some beneficent object in every one of Nature's works if they will but take the trouble to look for it.

OUR EARLY KINGS AND THEIR FORESTS.

BY HENRY SMART, M.A., HUGH MYDDELTON SCHOOL.

WHEN studying the history of our Norman and later kings, we must all have noticed how often we read of the forests. These constantly appear as a grievance of the people against the king. We can illustrate this by a few examples. 1. When Henry the First seized the throne on the death of his brother he issued a charter. In this, although it is by no means a long document, we find one short paragraph dealing with the forests. 2. On Henry's death the throne was seized by his nephew Stephen, who issued two charters. The first was a very short document, in the most general terms, issued at his coronation; the second, which is generally called Stephen's Charter, was issued later, when he had been received as king. In this second charter Stephen made large promises regarding the forests, which, however, he did not keep. 3. In Magna Charta several articles deal with abuses which had sprung up in connection with the forests; and in 1217 these matters were of such importance that they formed the ground of a separate charter—"The Charter of the Forest." 4. Not to multiply illustrations, the Long Parliament, in 1641, passed an Act for the Limitation of Forests. This is travelling beyond the limits of this paper; but in connection with our subject we ought to notice this Act, on account of the character of the reforms effected by the Long Parliament.

These examples are sufficient to illustrate the importance of the subject. When a king with a weak title wished to propitiate the people, he promised to reform the worst abuses of his predecessor; and we find Stephen referring to the forests. When the nation was roused to extort concessions from a tyrannical king, these concessions are a good indication of the worst grievances under which the people had suffered; and we find the forests dealt with in Magna Charta.

We shall treat of this subject under the following heads: 1. Meaning of the term "forest;" 2. Origin of the forests; 3. Conduct of our early kings regarding them; 4. Reasons for this conduct; 5. Forest Courts.

1. Meaning of the Term.

It is important first of all to point out what forests were not. They were not always wooded. From this it follows that districts could be "afforested" without any tree-planting. Many of the districts called forest were wooded, and we constantly read of "vert," or trees and shrubs, and "venison," or game; still, trees and shrubs were not a necessity. Again, we might find cultivated lands or even towns in the districts called "forest." The land in the forest region might be held by various owners, and might have been in their hands for generations, but at any time the king might assert his claim. We quote two definitions: "In its older meaning a forest had nothing to do with trees. It is a tract of land put outside the common law and subject to a stricter law of its own, and that commonly, probably always, to secure for the king the freer enjoyment of the pleasures of hunting;" and again, "Forest, from the Norman Conquest to the Commonwealth, bore the technical signification of crown land reserved for purposes of the chase, and as such cultivated and inhabited on sufferance, if at all."

Thus it is evident that the question of law largely decides forest areas. Wherever forest law holds there is forest. This is of great importance in connection with the question of afforestation.

Another interesting fact which appears is that the king claimed all the forests of the country. Attempts have been made to explain this claim. It has been said that "the right of forest was originally an outcome of conquest, through which the existing woods became folkland or common." When a tribe conquered a stretch of territory, the land which they could not occupy was called "folkland"—that is, the land of the nation. Grants could be made from this folkland only with the consent, or at least the witness, of the council, the Witenagemot. Under the Norman kings this folkland gradually became crown land. But this fact does not explain the claims of kings to *all* the forests of the country, even to the private woods of his nobles, lay or ecclesiastical. We cannot explain it, we can only assert it; which is precisely what the kings themselves did.

To sum up—(*a*) Districts called "forest" were not always wooded; (*b*) all forests, as we understand the term, were looked upon as the special property of the king; (*c*) forests were subject to special laws and courts; (*d*) all districts where these special courts carried out these special laws were "forest."

2. Origin of the Forests.

We come now to the question, How did these forests arise? In the first place, they arose from the old forests of the country. We know that in very early times this land was practically covered with dense forests, such as Andred's Wold, stretching south of the Thames between Hampshire and Kent, or the mighty forest north of the river, which reached almost to the Wash. Tillage and the working of mines gradually effected clearances; but when the English came these forests were sufficiently dense and well marked to influence the direction of their attempts at conquest and settlement. Even at the time of Canute we are told that practically two-thirds of the land was either forest or waste. To go further on, we may notice the Statute of Winchester, 1285, which directs that all undergrowth is to be cleared from the sides of high roads to a distance of two hundred feet. This was in order to do away with shelter "whereby a man may lurk to do hurt," but it is evidence also of the great extent of woodland. The forests concerning which so much trouble arose were generally remnants of the huge forests of early days.

These forests might be increased by planting. The well-known instance is that of the New Forest, which, whether it entailed much cruelty or not, certainly aroused much resentment. In other cases also kings enlarged existing forests by planting.

But "forests" were also largely increased by what can only be called declaration or assertion—that is, by increasing the sphere of activity of the forest courts. This was particularly the action of arbitrary and tyrannical kings. Thus John afforested whole counties, such as Cornwall and Devon. He was the worst, though not the only, offender in this respect. Charles the First revived this custom, and the Act of 1641 for the Limitation of the Forests complains that the bounds of the forests have been much enlarged by the action of the forest courts. Hallam gives several instances of this—one, for example, being that of the Earl of Southampton, who "was nearly ruined by a decision that stripped him of his estate near the New Forest."

This kind of afforesting was due evidently to the king's desire for revenue. We are not surprised at the frequent demand for a perambulation of the forests, such as that of 1300. The process may be compared with the enclosure of "common" land, and with the erection of special courts, such as the Council of the North.

3. Conduct of Early Kings regarding Forests.

It is very interesting to notice that our early kings clung to the forests. One of the most instructive questions of early history is the rise and opposition of various powers in the state—king, barons, church, and people. The Norman kings had need of the help of the English to maintain their power over their barons, while the English people needed the help of the king to save them from oppression and ill-treatment at the hands of the nobles. But although thus they were naturally allies, the forests always stood in the way, and helped to alienate king and subjects. If the kings could have brought themselves to renounce their forest policy, one of the greatest obstacles to the alliance between king and subjects would have been removed.

When Henry the First issued his charter, he declared that the forests which had existed under William the First and William the Second should remain in his hands, "with the common consent of my barons." When Stephen obtained the crown and issued a charter, he declared that he would give up the forests added by his uncle Henry, but would keep those of his grandfather William and his uncle William. Stephen was in a weak position, and therefore anxious to please the people; yet he did not keep his promise. Richard and John added largely to the existing forests, and in 1217, by the Charter of the Forests, these additions were disafforested.

Notice also the king's assertion of his rights even with regard to private forests. By the Assize of the Forest (or the Assize of Woodstock) the rights of owners of woods are restricted in the matters of selling and cutting timber (though they are graciously allowed to fell timber for such necessary purposes as firing), and the feeding of swine and cattle. These high claims were given up in 1217, when the Charter of the Forests affirmed the rights of private owners.

Thus the struggle went on from the time of the Con-

quest, till the perambulation of the forests in 1300 put an end to the strife for a time. The king always asserted his rights, based on we know not what, whenever he felt himself strong enough to do so; and the people always denied these rights, and sometimes forced him to give way.

4. Reasons for this Conduct.

We come now to what is really the most important point of all—What is the explanation of the kings' action with regard to the forests? Seeing that the people felt them to be so great a grievance, why did the kings persist in their policy?

The first reason given is that they were fond of hunting. We have all read that the Conqueror loved the tall deer as if he had been their father, and certainly in his case this explanation seems sufficient. His chief action with regard to the forests was the planting of the New Forest, and this is to be accounted for by his love of the chase. In this forest two of his sons lost their lives—Richard, whom it is said he intended to be King of England, gored to death by a stag; and the Red King, slain by an unknown hand. The Conqueror was not cruel, except from policy, as is shown, for example, by his treatment of Waltheof after the capture of York in 1069; but he inflicted terrible punishments on all who killed his deer, and the explanation is evidently that he wished to keep his hunting to himself. Similarly his great-grandson, Henry the Second, was a hunter, and it has been suggested that his reason for meeting his council at Clarendon in 1064, when the Constitutions of Clarendon were drawn up, and in 1066, when the equally important Assize of Clarendon was issued, was that the place was convenient for his hunting.

Thus it is evident that our early kings were great hunters. But there is another consideration which has been pointed out, and which increases the probable weight of their love of the chase, in the forest regulations of our kings. The first hint at forest laws comes in the time of Canute; but by that time the forests were beginning to dwindle. The increase of agriculture was necessitating the disappearance of the forests. Consequently, as hunting was endangered, so regulations in the matter grew. In very early days, when the forests were all but untouched, there was no need to legislate on hunting rights; but as the forests began to disappear, the kings became anxious about their favourite sport.

But although this explanation goes a long way it is not sufficient, and three others have been given. The first is that the forests brought in considerable revenue to the king. The forest courts are described below, and it is plain that from these courts large sums of money must have come to the royal pocket. Apart from the question of fines inflicted for various offences, inquiries were frequently held into encroachments upon the forests, and very heavy, sometimes ruinous, fines were imposed. Again, the forests—remembering what the term implied—provided a storehouse from which the king could make grants to needy or troublesome courtiers. The best example of this is provided by Stephen, who granted away so much that his successor recalled many of his grants, as the revenue had been seriously impoverished. Lastly, there were always certain sources of revenue open to the possessor of any real forest, in our meaning of the term. There was food for swine and cattle, and so royalty made money over the "pannage" of swine and the "agistment" of cattle; and there were charcoal and timber, so important in those days, and consequently so profitable.

Thus it appears that the forests provided considerable revenue for the crown. In the days when the king was constantly being exhorted to "live of his own," can we wonder that he was anxious to make "his own" as large as possible? When the king's revenue partly depended on such accidents as the death of a tenant-in-chief, we need not be surprised if he made the most of his forests. Some centuries later, when Charles the First revived old forest customs and inflicted fines for encroachment, he was trying to rule without the assistance of Parliament, and was experiencing great difficulty in raising money.

A third explanation, though not so weighty, is not without its importance. A whole army of officials was employed in the forests and the forest courts, from the master forester to the woodwards—verderers, regarders, foresters, rangers, and agistors. Even below the woodwards there were other servants. These were all servants of the king, and perhaps they may be regarded as a kind of royal force. It is evident that the presence of so many king's officials in various parts of the country would favour the ends of royalty, and we can quite believe that they would be useful for purposes of intimidation. It almost reminds us of the practice of giving "liveries." The master forester was independent even of the justiciar.

Lastly, we have an explanation the importance of which we can hardly overestimate. The forests and forest courts gave to the king a sphere for the exercise of jurisdiction and power outside his ordinary powers, a kind of extra-constitutional jurisdiction. It is most instructive to notice the way in which kings have clung to their extraordinary powers—the *prærogativa regis* of which we read so much later on. This struggle is naturally most noticeable during the period when parliamentary rule was becoming fixed. Consequently we may well compare the forest laws of early kings with the struggles of the Tudors and Stuarts over the Court of Star Chamber, the Court of High Commission, and other unconstitutional devices which brought on the great Revolution. But not only may we make this comparison; it was actually made for us by one of the judges in Bates's case, 1606. This judge, giving his decision against Bates, used the king's forest jurisdiction as a parallel case: "True it is that the weal of the king is the public weal of the people, and he for his pleasure may afforest the wood of any subject, and he thereby shall be subject to the law of the forest."

Thus so late as 1606 we find the claim put forward that the king ruled all the forests. We may then easily believe the words of Dr. Stubbs: "The forests of England were regarded, at least from the time of the Conquest, as the peculiar and personal property of the king, subject to his uncontrolled jurisdiction, and out of the scope of the common law of the realm." As said before, we cannot explain this claim, but it was asserted, and, whenever the king was strong enough, enforced. Thus Richard the First ordered all people to attend the forest courts, but by the forty-fourth article of Magna Charta those living outside the forest bounds were excused from attendance unless specially summoned for some reason. Similarly the claims of Henry the Second made in the Assize of the Forest to exercise jurisdiction by means of these courts over the clergy were given up when the Charter of the Forests was issued in 1217.

The forests gave the king a sphere for the exercise of private jurisdiction, and an extension of the forests meant an extension of that private jurisdiction.

5. The Forest Courts.

The earliest sign of legislation in the matter of the forests appears in the time of Canute: "And I will that every man be entitled to his hunting in wood and in field on his own possession. And let every man forgo my hunting; take notice where I will have it untrespassed on, under penalty of the full wite." This is interesting chiefly as being the earliest piece of legislation on the subject. It sounds more like a cry of "hands off" than a formal enactment. But we must remember that the force of such a general enactment depends on the strength of character of the king.

In the time of the Conqueror we find very severe penalties inflicted for various forest offences, such as the loss of the eyes for hunting the royal deer.

Under Henry the First cruel punishments—mutilation, fines, and whipping—continued to be inflicted upon those who broke the forest laws; but Henry the Second systematised the forest jurisdiction. In this, as in other things, such as the sending of itinerant justices, Henry the Second continued the work of his grandfather. Thus we find a whole system of courts. They were four in number:—

1. *The Court of Attachment.*—This was the lowest court, and met every forty days. Here suspected persons were "presented." It derived its name from the fact that the suspects were arrested, or "attached," by the foresters. This court prepared for

2. *The Swainmote*, which met three times a year, presided over by the verderers, four of whom were attached to each great forest. Here the reeve and four men from each township in the forest attended. The Swainmote declared as to guilt or innocence, but did not pronounce judgment, which was reserved for

3. The highest court, the *Court of Justice Seat*, which was held once every three years, and dealt with civil as well as criminal cases. This court was presided over by itinerant justices of the forests, of whom there were two—one for the country north of the Trent, and one for the country south of that river.

4. There was also a *Court of Regard* held in preparation for the Court of Justice Seat. This court was held under the "regarders," or inspectors of forests, officials who came next in rank to the verderers. The attention of this court was chiefly devoted to such matters as the "lawing" of dogs—that is, the cutting of their fore feet so as to render them useless for hunting. Unless dogs were lawed they were not allowed to be kept within forest areas.

Holiday Courses for 1905.—Courses, lasting from three to four weeks, will be held in August 1905, in the same four centres (Tours, Honfleur, Neuwied-am-Rhein, and Santander) where they were held in 1904. The dates of commencement will in all cases be in the first week of August, and the exact days will be announced later to all intending students.

A preliminary circular, giving particulars and lists of books to be read in preparation for the courses, will be ready in January next, and a Handbook, price 6d., post free 6½d., giving fuller details and final arrangements, on May 1. The courses in each centre will be graduated to suit the relative proficiency of the students. To prevent disappointment, it should be stated that students must have a fair grammatical knowledge of the language of the country visited, and be able to read its literature with some facility, if they are to derive profit from the courses.

A NEW SCHEME OF NATURE STUDY.

WINTER LESSONS.

BY EDMUND A. GREENING LAMBORN.

IN the September number of the *Practical Teacher*, in an article entitled "Some Aspects of Nature Study," reference was made to the suggestion of the Code of 1904 that the teaching in the subject known as Nature Study should be designed not only to exercise the children's faculties in the acquirement of knowledge of the external facts of nature, but also to lead them to the discovery of the existence of, and nature of, those fundamental laws and principles which underlie the scheme of creation, which control all the operations of nature, and of which the aforesaid external facts are but the outward manifestations.

It was pointed out that the old "Course of Object Lessons," by which a number of objects were selected, more or less haphazard, each for separate consideration in a separate lesson, tended to isolate the individual object, and to disregard its position as an integral part of a great scheme. It tended also to leave the children with the idea that they had in a measure reached finality in the knowledge of each object, by failing to make them view it in its relation to the rest of creation. All cannot be known of one till all is known of all; and, as is pointed out in the "Introduction" to the Code, while making a child realise his possession of God-given faculties for the acquisition of knowledge, we should also make him conscious of the limitations of human intelligence. To teach a child to refer the external facts of structure and function in an object to the law of its being is to lead him back to the infinite. To consider a natural object apart from its relations with others is to lose sight of the natural laws which govern the structure and functions of all in common; and any real nature study must make a child realise the idea of nature as a great scheme in which all things are interrelated and interdependent, and subject to universal law.

To take an example. Object lessons on clover, the humble bee, the field-mouse, the owl, and the cat, if considered separately, would seem to have little connection in any scheme. Yet if considered in their relations with one another, they illustrate, as Darwin points out in the *Origin of Species*, the great principle of nature as a corporate whole, in which "all things work together for good." The clover can only be fertilised by the long-tongued humble bee. The field-mouse destroys the combs of the latter, and hence affects the clover adversely. But the cats and the owls, by keeping down the numbers of the mice, ensure the preservation of the clover species, as the mice prevent its unduly increasing.

To trace such a connection as this is to study the *plan* as well as scrutinise the *detail*, and to realise that, as each peculiarity of organisation in the individual has its meaning and use to that individual, so the individual himself was created for a certain use and purpose in the organisation of nature.

The old object lesson related each detail of structure to the object as a whole, but did not relate the object itself to the wider organism of nature.

A scheme of nature study, then, should provide for the consideration of the objects with which it deals—

1. In their relation to other objects.

2. In relation to the natural laws which are exemplified in the facts deduced from them.

In the article before referred to a scheme was mentioned which had been drawn up on these principles. The subjoined lists show the winter's course of lessons, copied from this scheme. It is respectfully suggested that the course should be considered in the light of the previous article, of which it logically forms a part.

Winter Course of Lessons in Nature Study.

Objects.	Classes of Objects.	Natural Principles.
The Sun and Air. Heat and Cold. A Barometer.	The Seasons. (*a*) The Farmer's Year.	Gravitation.
Holly and Mistletoe. "A Christmas Tree" (the Spruce Fir). The Oak (*cf.* the Holm Oak).	Evergreens. Deciduous Trees.	Economy in Nature. (*a*) Natural Cycles.
A Carrot. A Cabbage. A Bulb. A Potato.	Taproots. Bulbs. Tubers.	(*b*) Winter's Store.
An Acorn A Broad Bean A Wheat Grain } growing in water or moss.	Seeds and their Structure. (*a*) External: 1. For preservation. 2. For distribution. (*b*) Internal: 1. Monocotyledons. 2. Dicotyledons.	Germination and Incubation. (*a*) The Origin of the Germ* (or Embryo). (*b*) The Protection of the Germ.†
An Egg. The Parts of an Egg (*cf.* the Parts of a Chestnut).	Eggs and their Structure. (*a*) External: 1. Shape. 2. Colour. (*b*) Internal: 1. Germ or Embryo. 2. Food.	(*c*) The Growth of the Germ.
The Robin. The Owl. The Hen. The Duck.	The Beaks of Birds. The Feet of Birds.	Modification of Structure. (*a*) In relation to Food.
The Hare (*cf.* the Rabbit). The Fox. The Cat.	Paws and Claws. Teeth. Animals that live in holes.	(*b*) In relation to Home.

The subjects of the lessons will be seen to be of three classes. There are—

1. A list of common natural objects, any of which may be observed in winter in their natural surroundings, and also subsequently placed before a class for study in detail. Fairly complete knowledge of these as individuals can be gained by the exercise of observation and deduction on the part of the child. Each is typical of a class, and its study should lead up to the subsequent study of its class as a whole.

2. A list of classes of natural objects in which the prevailing characteristics which distinguish the class are seen to result from a common habit or environment, while the minor distinctions which differentiate the individual members are similarly seen to depend upon peculiarities of habit or circumstance.

3. A list of natural principles illustrating the organisation and economy of nature.

Winter, of course, is not a favourable season for school excursions, which are usually essential in real nature study, and it is fortunate that most of its typical objects can be found near almost every school, or brought within it without losing much of the atmosphere of their natural surroundings. Carrots, or other taproots, and bulbs can be grown in water; acorns and other seeds from the autumn collection can be put in damp moss or sawdust to germinate. Eggs, in these days of incubators, can usually be procured without difficulty, in various stages of development, and compared with the developing seeds. The robin, the hen, and the duck can always be seen, and are typical introductions to classes of birds which, when summer brings them back, will be viewed with interest as relatives of familiar friends, and studied by the children independently on the lines suggested by the study of their more familiar relatives.

The classes of natural objects most in evidence in winter are the evergreen plants which stand out prominently among the bare branches of the apparently lifeless trees, the dry and rotting leaves, the sprouting seeds, the winter stores of food hoarded up by plants and animals, and the few live creatures that break the monotony of the winter landscape.

The peculiar structure of the evergreen leaves, by which they are able to resist the cold—the thicker substance, less exposed surface, and glossy skin, from which the snow and rain slip—can be seen and compared with the leaves of deciduous plants. The extreme brightness of the berries, necessary if they are to be seen in the thick foliage, may be compared with the duller red of the berries in the bare hedges. The bramble and alder should also be noticed as forming, as it were, links between the evergreen and deciduous species.

By experiments in school the composition of leaves may be discovered, and its original source (the soil) inferred. Then the "rotting" of the fallen leaves may be considered, and the formation of leaf mould, showing that the plant returns to the ground a part of what it took from it.

Potatoes, taproots, a cabbage, etc., may be dissected and subjected to simple chemical tests, to discover the nature of the "plant-food" stored up in them. The reason for the early flowering of the snowdrop, crocus, and "bluebell" or hyacinth may similarly be found in the examination of their bulbs or corms.

These stores of food can be compared with those made by partial hibernators in the animal and insect world. The relations of the seasons to the food supply, and the food supply in relation to migration and hibernation, are interesting lessons which can be touched upon again in autumn.

The natural principles whose considerations suggest themselves in winter are: The rest of nature after the harvest, which is yet but a preparation for the work to come; the economy of nature, by which the sap is withdrawn from the useless leaves, and the leaves themselves used to feed a fresh generation. Hence the principle of the cycle in nature, seen again in the seasons, in the raindrops, in the study of the stars. Thus the law of gravity is suggested, and is seen to hold the earth in space, cause its seasons, and hence its fruits, to follow one another in due order, and even to be the force which sows the seeds, by causing them to fall from the tree. So one is naturally led to consider the mysterious process of germination.

The universality of these laws makes one able to apply them outside the limits of scientific teaching, and so make nature teach the elder children directly, as she may teach the smaller ones indirectly, some of those moral lessons which educators have preached but examiners ignored. For example, the moral law of work may be seen to be universal in nature, and to rebuke man's sin of idleness. The duty of thrift and provision for the future is another lesson from nature. The fact that nothing is insignificant is seen in the application of one and the same law to the stars, and the earth, and

* "Fertilisation," in summer course of lessons.
† "The Protection of the Helpless," in autumn course of lessons.

the acorn which falls upon it. So the rolling of the planets is no more and no less wonderful than the falling of the acorn, for all obey the same law.

"The very law that moulds a tear,
And bids it trickle from its source,
That law preserves the earth a sphere,
And guides the planets on their course."

THE GEOGRAPHY NOTEBOOK.

A FEW HINTS.

BY HERBERT A. WATTS.

A NOTEBOOK for geography is an essential in the upper standards, particularly in Standards VI. and VII. Its use in standards lower than VI. is open to criticism, but from personal experience it may be unhesitatingly recommended for use in all standards from IV. upwards.

. Unfortunately, the notebook of the past has been in the main merely a model of correct transcription, denoting an infinite capacity for taking pains, and exhibiting a finicking admixture of red lines and copperplate. Its utility has been obscured, if not entirely lost sight of. What is wanted is a practical notebook showing signs of a little originality, some individuality, and a lot of information—but information of a promiscuous kind, not the cut-and-dried, dust-covered variety which has done duty through the ages, and which is still dished up with the slightest possible taste of a twentieth-century sauce.

Take an ordinary exercise-book, utilise the right-hand page of each opening for a few brief, pointed notes from the teacher's lesson, and leave the filling of the left-hand page to the child. Require him to insert a number of sketch-maps, rough as you like, and newspaper cuttings, dealing with the points on the right-hand page. At the present time, owing to the enterprise of newspaper proprietors, paragraphs of educational value are appearing daily in profusion. What more easy, interesting, and up-to-date than to request the scholar to cut out such paragraphs bearing on the work done in class, to submit them for sanction, and to paste them on the spare page?

Take, for instance, the voyage to India. On the front page of most London dailies will be found an advertisement of the sailings of the P. and O. Line, giving the names of the steamers, the places called at, and the prices. Let the pupil cut this out, paste it in his notebook, and accompany it by a very rough sketch-map, a picture or so of the exterior and interior of a liner, and of the places stopped at *en route*, and he has a graphic and pictorial representation of the voyage. Moreover, the page will be the lad's own, unlike his neighbour's, due to his own enthusiasm and ingenuity. The use of foreign stamps and postmarks will at once suggest itself—in fact anything which gives a touch of the real present-day, tangible geography in place of the wearisome groping for the abstract which so dulled the edge of interest.

At the end of the year each scholar will be the possessor of an instructive picture-book of his own making, containing a miscellaneous collection, methodically arranged, of newspaper cuttings, pictures, photographs, sketch-maps, postage stamps, postmarks, and a short, supplemental summary of each lesson. Present his book to each boy, and to the owner of the best notebook (that is, the notebook showing the greatest variety of illustration, not the spick-and-span, minute-attention-to-detail species) give a suitable prize.

A set of such books, say from Standard IV. upwards, bound into one book, would form a volume brimful of information collated in a style most suited for handy reference, surrounded by a halo of enjoyable reminiscences.

SCHEME FOR THE INTRODUCTION OF SYSTEMATIC PHYSICAL TRAINING INTO PUBLIC ELEMENTARY SCHOOLS.

BY H. RIPPON-SEYMOUR,

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THE Education Codes of England and Scotland have recently made physical training practically a compulsory subject, and no doubt this is a step in the right direction. This has more lately been followed up by the issue of a "Model Course" of exercises, which is evidently intended to be generally used.

One difficulty, however, at once presents itself. This new course is on rather different lines from any system now in general use in schools—in Scotland, at all events—being, as I have remarked in a previous article, practically "Swedish drill." The majority of class teachers have but little acquaintance either with its methods or its commands; consequently, unless something is done by local educational authorities towards providing the teachers under them with efficient instruction from an expert, the new model course, excellent as it is, will for a long time be "wasting its sweetness."

The committee responsible for this syllabus of exercises lay great emphasis on the importance of the teachers being provided with "abundant opportunities" whereby they may not only qualify themselves to teach these exercises, but in addition obtain a knowledge of the "wider questions of health and physical condition" of the children with whom they come into such close and constant association.

In short, teachers should have the opportunity of attending classes where they may learn the new exercises from an expert, and their physiological value from a medical man.

The object of this article is to show how this may be accomplished with as little additional outlay to school boards or county educational committees, or extra work to teachers, as possible.

That organised disciplinary recreation *is* a necessity for children may by this time be taken for granted, for after a perusal of the reports of the Royal Commission on Physical Training, or the Committee on Physical Deterioration, there can exist but little doubt in the mind of any thinking person that physical training is at least one way in which matters may be improved. But for the benefit of those who may not have given this branch of education special consideration I propose to divide my subject into three heads, which are as follows:—1. To show that physical training is a necessity; 2. To show that systematic physical training has proved beneficial where adopted; 3. To explain the scheme of instruction.

1. *To show that physical training is a necessity.*

Now, although it may be admitted that recreation, commonly known as "play," is necessary for children,

it should be a matter of grave consideration for parents, guardians, and those charged with education, in what form and to what extent children should take such exercise. It is a fact, though a sad one, that many children are forced to take their play or recreation in that worst of all schools the street, where, as years go by, vices in various forms are learnt, which become, unhappily, almost ineradicable.

If, on the other hand, systematised physical training and organised games be introduced into the school life of the children from their earliest days upwards, a healthy love of exercise is inculcated, the streets with their attendant evils lose their charm, and other and better forms of amusement take their place, such as gymnastics, running, rowing, football, etc., or even the simpler exercise of walking, which last is within reach of all.

It is, I think, Dryden who says, "The wise for health on exercise depend;" and the chief objects of physical education for children are health, all-round bodily development and growth, discipline and recreation. The means of attaining these during school hours are drill, gymnastics, and organised games.

With the adoption of a proper system of physical training it is quite possible to provide a "disciplinary recreation"—but it is here that the *art* of the teacher is required, lest the lesson be allowed to become monotonous and disliked; and, further, by its aid it is also possible to make good use of much of the superfluous energy which is so frequently turned into a wrong channel.

The physiological law that the "structures and functions of the body increase with use, and waste with disuse and idleness," lies at the foundation of all education; and just as the class lessons develop and train the mind by the use of the senses, so the physical lesson develops the body by the use of the muscles.

We may now proceed to the consideration of the next division of our subject—

2. *To show that the results of such training have been beneficial where adopted.*

On the authority of medical practitioners, and of several headmasters who many years ago introduced a system of drill into their schools, it is universally attended with the very best results, some of which are as follows:—

(1.) It in a great measure tends to relieve the strain of mind consequent on the almost continuous study of the different class subjects.

(2.) It improves the physique, and by practice with free apparatus the equal use of both hands is taught. This in time will tend to eradicate the very common nervous deformity "left-handedness."

(3.) In performing the exercises, in addition to producing motion, the muscles have other very important duties. They promote the circulation of the blood, by calling for an increased supply when in action; they press on the blood-vessels and send the blood more quickly to the heart and lungs. In this way muscular exercise promotes the nutrition, secretion, waste, and finally reconstruction of all the tissues of the body. Hence the importance of physical culture from a racial standpoint.

(4.) The performance of any kind of drill to music allows the brain to rest from active thought, an exact rhythm of movement is secured from a considerable number of pupils, and the ear becomes trained to a recognition of time and tune.

(5.) It has been proved, after the closest observation, that the time actually taken from hours devoted to lessons is more than regained by the greater aptitude with which the children do their work after such exercises.

(6.) The necessarily stricter discipline enforced when at drill enables the teachers to exercise greater control over the children whilst in their classrooms.

(7.) It is also noticed that as the children grow older and more able to look after themselves they take more pride in their personal appearance, their manners improve, and corporal punishment becomes a rarer occurrence.

(8.) So far from the work being considered in any way a task, either by teacher or pupil, the following extract from a letter by Mr. Chesterton, Organising Teacher of Physical Education to the London School Board, will show how London stands with regard to this matter. He says, "The work is most popular with both teachers and pupils."

Having briefly shown the necessity and effects of a wise physical training, it is now necessary to show how it can be carried out at a minimum of trouble and expense to teachers and their employers.

3. *To explain the scheme of instruction.*

It is, of course, quite impossible for a few instructors to attempt to teach with good results the enormous number of children now under instruction at public elementary schools. Nothing of this sort is contemplated, however. It would be the assistant teachers who would give the lessons in physical training, such lessons to be daily if possible; in fact, to be of the greatest value a short lesson twice daily is greatly to be preferred to one long one. If, therefore, the recommendations of the committee are to be carried out, the class teacher is the only person who *could* be present on two occasions daily.

To make sure that the whole of the teachers are really conforming to the syllabus of exercises, they must draw their knowledge of them from one common source, which can only be done by appointing a superintendent of this branch of education; because if the methods of performing the newly-prescribed exercises were left solely to the discretion of the individual teachers or various instructors, no uniformity of system would exist, and it would be impossible for the inspectors to make any *just* comparison as to the progress made in the various schools. It is therefore suggested that—

(1.) The whole of the teachers (except those teaching special subjects, such as art, French, music) would attend a training centre twice a week, probably between 6 and 7 p.m., to receive practical and theoretical instruction under the superintendent.

(2.) An examination held (say quarterly) by the Board in the presence of one of H.M. Inspectors should be passed by the teachers in order to qualify for certificates of proficiency in drill.

(3.) On receiving certificates they would be considered qualified teachers in drill, and having been taught the same system, they should be able to teach the same drill to any class in any school.

(4.) They would be held responsible that the system adopted was adhered to in its fundamental principles, so that there would be no difference between the work of one school and that of another.

(5.) The male and female teachers would receive instruction separately.

It must not be thought, however, that when all the teachers have been instructed the superintendent's work ceases. In reality it has only begun. During the day he would visit as many schools as practicable, and assist in the work, helping and advising the teachers. He would be required to visit the schools periodically to see that—

(1.) The teachers allowed no irregularities to creep in.

(2.) Every teacher was efficient.

(3.) Those teachers whose method of instruction was not right were helped, and received further instruction. He would require to see that the infants and weakly children were not exercised beyond their capacity—a branch of the science of physical culture which only an expert perfectly understands—and he would also give assistance when and where necessary.

(4.) The superintendent might also award marks to each class and school visited, in a book kept for that purpose, for his own reference and also for the guidance of the inspector at his annual visit.

(5.) It would also be probably expected of him that he should report weekly or monthly on each school visited regarding—

(*a*) The number of certificated and uncertificated physical training teachers in each school.
(*b*) The progress made since last visit.
(*c*) Time daily allotted to physical training.
(*d*) Time allowed for playground recreation.
(*e*) Reasons why some teachers do not possess certificates.
(*f*) Suggestions as to alterations in system or in time allowed for drill.
(*g*) The number of children (1) under instruction; (2) not under instruction, and why.

Such a scheme as has been here outlined should certainly provide efficient instruction for our children; and further, the performance by the individual teacher of the exercises cannot fail to produce a better physique.

NOTE.—*Readers or educational authorities desiring further details of this scheme should address letters to the* **Author, care of the Editor,** *and must enclose the coupon on back page of the cover and stamped addressed envelope.*

INDIAN CLUB EXERCISES

FOR SENIOR PUPILS IN ELEMENTARY SCHOOLS.

BY H. RIPPON-SEYMOUR,

Chief Instructor, George Watson's College, Edinburgh; Member International Congress on Physical Education, Paris, 1900; Author of "Physical Training," etc.

Second Series.

THIS series of exercises includes swings behind the head, and they are frequently a source of great difficulty with many pupils, at first at all events. Before commencing to teach a combined "front and rear swing," all the pupils should learn the "rear swing" thoroughly with the right, the left, and then with both hands and in both directions.

Fig. 7 shows the position of the right hand for an "outward rear" swing; the knuckles of the hand are within an inch or so from the ear. Fig. 8 shows the club being passed outwards and downwards behind the back, and in Fig. 9 the club is just passing the waist and being lifted up to its commencing position.

FIG. 7.

FIG. 8.

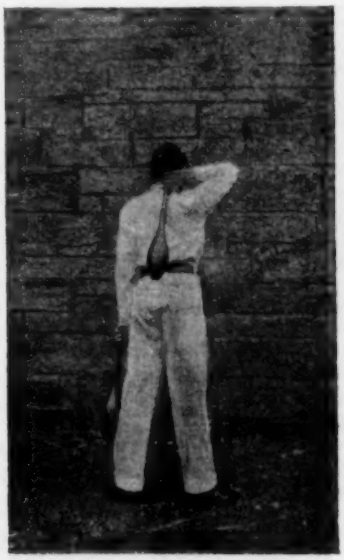


FIG. 9

This swing is performed principally from the wrist, and the teacher must see that the "body" of the club is lowered close to the waist, as shown in Fig. 9. At first all the pupils should practise this swing without attempting to keep time, until successfully accomplished, when the class should perform it as an exercise in unison. The left hand "outward rear" swing must then be attempted and thoroughly mastered before proceeding to the right and left hand "inward rear swing."

These swings, as their names imply, are exactly opposite to those just described, and it should only be necessary to glance at Figs. 7 and 9, and imagine the club describing a circle *towards*, but behind, the head, instead of *away* from it, as in the outward swing. Fig. 8, in this case, shows the club just *rising* to its first position after describing the circle. The same exercise must now be learned with the left hand, which usually proves a somewhat difficult task.

Double Rear Swings.

Having mastered these four movements, it would be as well to try *both* hands at once, the clubs moving in the *same direction*, though the *swings* are practically opposite: for example, in performing the double rear swing to the right, the right club is circling *outwards* and the left club *inwards*, although from the front view both clubs travel in the same direction.

If these four swings are thoroughly learned by a class, there should be little or no difficulty in teaching any swing which will be afterwards given here, as these swings are practically the foundation of all Indian club exercises.

Single Outward Combined Swing.

"**One.**"—From the "ready" position raise the right hand, and make an "outward swing," as described in 1 (Fig. 4).

"**Two.**"—Bend the arm sharply until in the position shown in Fig. 7, and at once describe an "outward rear" swing, as already taught.

When nearly perfect give the command "Commence." Whenever desired give the command "Steady," when the pupils will bring both clubs to the "ready" position.

Practise thoroughly with the left hand also.

Double Combined Swing (Right).

"**Ready.**"—As before described (Fig. 3).

"**One.**"—Make a "double right swing," as previously described in the first series (Fig. 5); and,

"**Two.**"—Without perceptible pause or jerk bend the arms, and make the "double rear swing" towards the right, allowing (if desired) the shoulders to make a slight turn in that direction (Fig. 11).

After some degree of perfection has been attained in this direction, practise the double combined swing (left).

"**One.**"—As described above, reading "left" for "right," etc.

"**Two.**"—As described above, reading "left" for "right," etc. (Fig. 12).

Fig. 10.

Fig. 11.

Fig. 12.

Repeat as often as necessary by "numbers," and when practically perfect give the command "Commence," and endeavour to obtain correct "time" from all the pupils.

As this swing may take some little time to teach correctly, the pupil's disengaged arm and club may be allowed to hang quietly by the side, as shown in Fig. 10. Here it will be seen that the pupil has made a slight turn of his shoulders at the completion of the "outward rear" swing. This turn may be allowed or not, as desired, but it sometimes assists the pupil in making a free movement.

Practise also with the left hand.

Single Inward Combined Swing.

"**One.**"—From the "ready" position (or with disengaged arm hanging at side) raise the right hand, and describe a "single inward" swing with a straight arm.

"**Two.**"—Without pause bend the arm and perform an "inward rear" swing, and repeat these movements "by numbers" as often as necessary.

As the "double combined swings" to left and right form what may be called the "key" to club exercises, the greatest care must be taken to see that pupils thoroughly master this exercise before proceeding to more advanced movements. The body of the club must be allowed to drop well down behind the back, and on the completion of the "rear" swing the hands *must* be raised to the full extent of the arms above the head, as in Fig. 5, before commencing the "double right swing."

The author will be pleased to answer in these columns questions of general interest on drill and physical training. Letters should be addressed to the **Author, care of the Editor,** *and must enclose the coupon on back page of cover.*

ANSWER TO CORRESPONDENT.

Alpha.—A series of exercises in dumb-bells and staves has already appeared in this magazine, and articles on Indian clubs are now appearing. These will shortly be issued in book form, and are specially intended for the purposes you mention—namely, the physical instruction of senior pupils and pupil teachers.

NOTES ON AN EXPERIMENTAL COURSE OF LESSONS ON AIR AND WATER.

BY E. J. RUSSELL, D.SC. (LOND.),
Lecturer in Chemistry at the South-Eastern Agricultural College, Wye.

(*Continued from p. 234.*)

DO not say that the results of Experiments 17 and 19 are due to "suction." However convenient the word may be, it is not a correct explanation of the facts. Instead of invoking a mysterious force acting inside the vessels, lead the class to see that the cause is the pressure of air acting from outside.

The pressure of the air can be made to drive liquids up to a certain height.

Experiment 20.—Connect the neck of a filtering flask to the air pump, and the side tube to a vertical piece of glass tubing about 36 inches long, dipping under coloured water or ink. The air inside the tube exerts the same pressure on the liquid as the air outside does, and consequently nothing happens. When the pump is worked, however, some of the air is withdrawn. The internal pressure is therefore diminished, and the excess of pressure outside drives the liquid upwards.

Filtering flasks cost about a shilling each, and are much more convenient for this and some subsequent experiments than ordinary flasks or bottles.

The tube may be any height up to about 34 feet. In college lectures I use one 12 feet high, built on to a stand made by the carpenter.

If it is thought desirable to go into technical details, a few remarks about pumps may be inserted here. Water rises in a pump because it is forced up by the pressure of the atmosphere on the surface of the well. The common pump ceases to act before the 34-feet limit is reached, owing to unavoidable leakage at the valves.

Experiment 21.—Hand round a small bottle of mercury. Let the class see that it is much heavier (13·6 times) than water. Substitute mercury for water in Experiment 20. Owing to its greater weight, it cannot be pushed up by the air pressure to anything like the height attainable there. It stops when about 29 to 30 inches from the surface.

Experiments with mercury should be carried out on a wooden or other tray to prevent loss. Dirty mercury can be cleaned by wiping with blotting-paper or filtering through it, a few pinholes being made for the purpose. If by chance any has been spilt, and has fallen into chinks or crevices, suck it into a wash-bottle as used in chemical laboratories.

The Barometer.

Experiment 22.—Make a barometer by filling a clean and carefully-dried tube, sealed at one end, and about 34 inches long, with clean mercury. Invert in a basin of mercury. When careful precautions are taken, such as are described in books on physics, the mercury continues to fill the tube, and more or less gentle tapping is required to bring it down. But in general the column at once falls till it stands about 30 inches above the outside level. The air can push it up no higher than it did in Experiment 21. In the space above there is a vacuum.

Experiment 23.—To show that there is nothing in this space, pour some coloured water on the mercury in the basin and gently raise the barometer till it comes into the water. This is equivalent to passing from Experiment 21 to Experiment 20. The water can be pushed up more than 30 inches, and as it displaces the mercury it fills the tube.

As a matter of fact, a perfect vacuum has not yet been obtained. It is easy to prove the presence of mercury vapour in the "vacuum" of these experiments. Professor Dewar states that when this is removed glass begins to give off vapours.

Experiment 24.—Seeing that the mercury is forced up the tube by the pressure of the air, we can form an idea of the amount of this pressure by determining the weight of the mercury column. Weigh the empty barometer tube, fill and invert as before, hold as near to the mercury surface in the dish as you can, put your finger under the tube, and lift out. Weigh again. Calculate your result to a tube of one square inch sectional area.

Experiment 25.—Fix a barometer tube through the cork of a filtering flask containing some mercury, and tilt so as to fill the barometer. The side tube of the flask must be stopped up during the operation, and the cork must not be fixed in the neck of the flask, but only lightly placed there. You can thus move the barometer independently of the flask. When the tube is full, drive the cork home and cover it with a thick layer of Faraday's cement. (See p. 233.) The filling process is a little tedious, and requires some patience; but the apparatus is useful for other experiments, and it is desirable to make it.

Mark the height of the column with stamp paper. Reduce the pressure in the flask, and the barometer falls. This is what happens when a barometer is carried up a mountain. The amount of air above being less as one goes higher, the pressure is less. Over a small range the barometer falls one-tenth of an inch for every 90 feet of ascent, but for great heights the calculation is somewhat more complex. The atmospheric pressure at the top of various hills can be indicated.

The change in pressure with varying altitude is more sharply shown with a water barometer. Here the change is 1·4 inches for every 90 feet. Water barometers are not convenient instruments to use, but you may be able to illustrate the point from the fluctuations in pressure of the gas supply. The pressure is probably the atmospheric pressure at the works plus the pressure of one or two inches of water. For every 90 feet you are situated above the works you get an increased gas pressure equivalent to that of 1·4 inches of water.

Water vapour is lighter than air in the proportion of 9 : 14·43, and if much is present the total weight decreases and the pressure falls. In this way a barometer may foretell rain.

Collection, Measuring, and Storing of Gases.

Experiment 26.—Fill a gas jar or wide-mouthed bottle with water, and invert in a dish of water. Blow air in; mark the level with stamp paper. Remove, and fill to the mark with water. The volume of water you now have in the cylinder is equal to that of the gas you blew in.

Experiment 27.—Through the cork of a Winchester bottle drive two tubes—a long one bent twice at right angles, reaching to the bottom of the bottle, and a shorter one just dipping inside the cork. Blow air in through the shorter tube. Collect and measure the water driven out.

Experiment 28.—To show that air pressure can be stored, fix a pinch-cock on to the shorter tube and attach a jet to the longer one by means of a piece of india-rubber

tubing, also fitted with a pinch-cock. Partly fill the bottle with coloured water. Open the pinch-cock of the shorter tube and blow in as hard as you can, keeping the other closed. If your joints are sufficiently good, there will still be sufficient pressure, even at the end of some hours, to produce a fountain when the proper stop-cock is opened.

Wide Distribution of Air.

The air stretches a long way up. There is evidence that it extends to a height of over a hundred miles. It is found dissolved in water, and renders fish and plant life possible. The *Challenger* expedition found it in sea water even at the bottom of the ocean.

Experiment 29.—Take a half-litre flask; fit a funnel through the cork, and fill the whole with water. Invert a test-tube filled with water in the funnel, and fasten in position. Boil the water in the flask. As the air is expelled it collects in the test-tube.

Air also occurs in soils, where it is necessary for plant growth.

Experiment 30.—Into a flask or bottle with a long, narrow neck place some loose soil. Rapidly fill up with water, and cork. Shake well. The soil forms a thick mud, and the air previously entangled in it comes out.

As much as 50 or 60 per cent. of the apparent volume of dry soil is sometimes air.

Porous bodies absorb and retain air.

Experiment 31.—Attach a sinker to a piece of wood charcoal. Put under water in a bottle, and pump air out. Bubbles of air at once rise from the charcoal. After a time it loses so much air that it will no longer float, but sinks to the bottom.

OUR ILLUSTRATED GEOGRAPHICAL NOTEBOOK.

THE CONGO FREE STATE.

THIRTY years ago the exploration of Central Africa was interestedly watched by the leading nations of Europe. Livingstone had laboured for years to discover the source of the Nile. In 1867, while exploring the region between Lakes Nyassa and Tanganyika, he discovered a great stream that flowed into Lake Bangweolo, from whence it passed to Lake Moero. He believed this river was the Nile. In 1876 the *New York Herald* and the *Daily Telegraph* dispatched H. M. Stanley to explore these little-known regions. He completed Livingstone's work, and proved the streams to be the upper courses of the Congo, and thus made known to commerce and civilisation one of the greatest water highways of the world. This led to the establishment in 1883 of the Congo International Association, under the presidency of Leopold the Second, King of the Belgians. Two years later, at a conference at Berlin, the Congo Free State was placed under the sovereignty of Leopold, "on the basis of a personal union with Belgium." The conference established freedom of trade in the basin of the Congo, its tributaries, and lakes, and rules were laid down for the protection of the natives and the suppression of the slave trade. In 1890 Leopold transferred his sovereign rights to Belgium, to which country was reserved the right of annexing the whole territory in 1900.

The boundaries of the state have been defined at various points by treaties with Britain, France, Germany, and Portugal, whose territories the state adjoins.

The Congo.—This great equatorial river-basin is the second largest in the world. It takes its rise in Lake Bangweolo, from which it issues under the name Luapula, afterwards expanding into Lake Moero. The river is still called Luapula as far as Nyangwe. Between this station and Stanley Falls Stanley named it the Livingstone; from that point to the sea it is the Congo proper. The volume of water passing Nyangwe is 123,000 cubic feet per second in the dry season, which is five times greater than that of the Nile at Gondokoro. The tributaries are numerous, and include very large streams, of which the Mobangi and Aruwimi on the north bank, and the Kassai, Sankurra, Lubilash, and Bolobo on the south bank, are the chief. The following is Stanley's table of distances along the Congo:—

	Miles.
Banana to Vivi, navigable for ocean steamers of eighteen feet draught	110
Vivi to Isangila, by road, past cataracts	50
Isangila to Stanley Pool (Leopoldville), navigable for small steamers	173
Leopoldville to Stanley Falls, for craft of four feet draught only	1,068
Above Stanley Falls to Nyangwe, navigable	385
Nyangwe to Lake Moero	440
Lake Moero	67
Lake Moero to Bangweolo	220
Lake Bangweolo	161
Bangweolo to sources of the Chambesi	360
Total length of Congo highway	3,034

The area of the Congo basin is not less than one and a quarter million square miles. The great affluents afford over 12,000 miles of accessible waterways. At the mouth of this mighty water system 2,000,000 cubic feet of water is poured unceasingly each second into the Atlantic.

Climate and Productions.—The area of the country is estimated at 900,000 square miles. The climate of the whole area is purely tropical, the average temperature ranging between 79° and 84°; it is absolutely unsuitable for the occupation of white men. Only a few years ago a British consular report stated that no emigrant should set out for this part of the world unless he be "a well-salted animal or a man prepared to die." The consul gave particulars to confirm the necessity of his warning. "It is estimated that of every ten whites who become officers of the state, nine are either buried or invalided within three years; and a calculation was made a short time ago which showed that the employés of the largest Belgian trading company, numbering one hundred and twenty, only maintain an average service of seven months out of the twenty-four for which they contract.

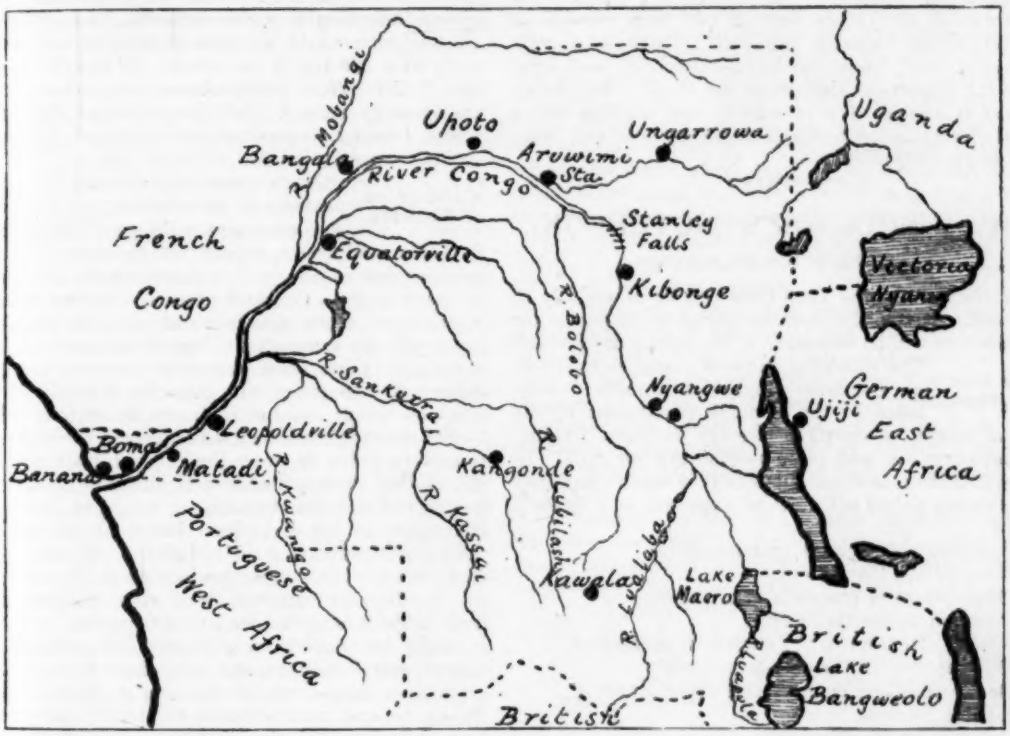
"The missionaries suffer somewhat less, perhaps, being, as a rule, more careful to avoid unnecessary exposure, and also better provided with the means of combating disease. They fall, however, with startling frequency; and amongst them, as amongst the officials and traders, the word is constantly being passed to close the ranks. A favoured few—two per cent. about—appear to be adapted to the climate in some way or other, and not only survive, but keep strong and well. But for those who are neither lucky as to their constitution, nor reckless as to their fate, life is a perpetual vigil against treacherous fevers, and, when nerves become weakened by the strain, an existence regulated by the clinical thermometer."

The vegetation is marked by that luxuriance that

obtains in tropical regions. There are vast forests, especially in the east. The banana and mango abound, together with different varieties of the palm; rubber plants and trees are abundant; coffee, the vine, and orange grow wild in different parts. Sugar, cotton, and tobacco can easily be grown, and this last already figures among the exports.

People.—The population of the Congo Free State is between thirty and forty millions, chiefly of Bantu origin. The Europeans number less than 3,000, of whom about half are Belgians. There are many languages, and still more dialects, for each tribe possesses its own. Almost everywhere the religion consists of revolting forms of fetishism. The European exploration of the Upper Congo led to the Arab exploitation of these regions, and the slave trade was carried on without restriction. Slave-dealing has now almost disappeared, but domestic slavery is still common. Within the limits of a brief article it is impossible to attempt to describe the various tribes and the revolting features which most of them present. For example, the Ba-Ngala nation are a fine race, whose natural features are by no means unpleasing to Europeans. These people eradicate their eyelashes and eyebrows, and sharpen their teeth to a point. They further disfigure themselves by tattooing, incisions, and ligatures, which impart a loathsome appearance. The explorer Grenfell mentions a young girl who had produced a wen on each side of her nose so large as to prevent her looking forward. "In order to recognise anybody, she had to lower her head to allow the glance to avoid the obstruction caused by these 'beauty spots.'"

In the Rua country, west of the Lualaba, two punishments only were recognised—mutilation and death. The ruler was looked upon as god. The founder of the dynasty was reputed to be a fetish residing in the heart of a forest into which even the wizards might not enter. Only the king and his sister were allowed to consult this deity. At the ruler's death a number of women were compelled to accompany him beyond the grave, which was dug in a river-bed from which the water for a time was diverted. The second wife was first sacrificed, and then the grave was lined with living women. The body of the dead king was then laid within, the pit was closed, and slaves were sacrificed upon the top. The river was then restored to its bed, and the waters hid for ever the traces of the ghastly ceremony. The most hideous practices are still carried out where the white man is not in evidence, and cannibalism is by no means unknown in the more remote regions. There are seventy-six mission stations, with three hundred missionaries, and perhaps nowhere in the wide world is there so much scope for civilising and Christianising influences.



Commerce.—Most of the trade is carried on along the navigable waterways. Roads are practically non-existent. A railway of 250 miles connects Matadi with Stanley Pool, and about a thousand miles of line are in course of construction in different parts of the state. A line to connect Nyangwe with the Victoria Nyanza would open up the district and create a trade with the east coast. Boma and Banana are the ports of entry; about half the total tonnage is Belgian. The total trade of the state in 1902 was:—Exports, £2,013,000; imports, £724,000. The trade with Great Britain amounts to about £200,000 annually. The chief exports are ivory, rubber, palm oil, and kernels, hides, tobacco, and coffee.

Present Problems.—The natural conditions of the country and the ignorance and savagery of the inhabitants present many difficult features to be coped with

by the administration. Unfortunately, Belgian officials adopt measures that make for neither peace nor progress. Atrocities in the Congo State are a standing feature in the news from Central Africa. Natives are maltreated, and white traders are hampered by unnecessary restrictions. The complaints of British traders were so frequent and so well authenticated that the British Government forwarded a note to the powers interested in the state, calling attention to the existence of the charges, and suggesting that the whole matter be referred to the Hague Court for investigation. The officials of the Congo State replied to the charges in an unsatisfactory manner, and King Leopold, whose interest is largely a financial one, visited several European courts with a view to enlist sympathy. By means of pamphlets and newspaper articles the Congo authorities have endeavoured to work up an Anglophobe agitation to obscure the real issues.

There is in the Congo State a vast area capable of yielding many valuable products. There is a vast population that, under civilising influences, will form one of the important markets of the world. At present progress is almost at a standstill, and nothing but a radical change in the methods of government will bring about improvement.

THE INSPECTOR'S NOTEBOOK.

BY AN INSPECTOR OF SCHOOLS.

IN a few months the 1904 Code will be universally in force. It will, therefore, be useful to consider what modifications will be necessary in the school curriculum.

New Code Syllabus. The following subjects comprise the ordinary course—English, arithmetic, knowledge of the common phenomena of the external world, geography, history, drawing, singing, physical exercises, and plain needlework for girls. In the amplification of these subjects it is made clear that the following points will now be expected, as a general rule :—

1. Speaking with correct pronunciation.
2. Composition throughout.
3. Descriptions of processes in arithmetic.
4. Common things throughout.
5. Special attention to the empire in geography.
6. Development of the empire in history.
7. Brush work and memory and object drawing.
8. Singing by note.
9. Cutting out for older girls.
10. Simple hand and eye training.
11. Grammar.

Whilst most of these matters have for a number of years been amply dealt with in most of the large urban schools, many of them have been neglected by the rural schools. In a very large number of schools even in towns the children do not receive full training in the art of speaking correctly. It is very satisfactory to have these points definitely laid down in the Code. We shall now possibly be able to persuade teachers to explain lucidly the *processes* in arithmetic. Singing by note must now, unless there are special reasons to the contrary, be attempted by all.

Brush Drawing. Brush drawing is no longer an optional subject, although I presume there will be less haste over enforcing this point than in the case of the others. It is surprising to find that a large number of teachers still regard this as a fad, and expect it to go the way of other fads which have waxed and waned. It is quite ten years ago that brush drawing came in with the alternative drawing syllabus, and from that day to this it has been increasing in popularity, until at the present time it is attempted in all the large centres of population. Brush drawing has come to stay, and I advise teachers who have not yet adopted it to give some attention to the subject without delay. It should be introduced gradually. During the first year let the youngest children do it, and let these carry it on through the school. Where classes are large and there are few teachers, it is advisable to keep a quantity of paint ready prepared rather than to let children mix their own colours. There are many good courses in the market just now. They mostly take the form of brush-drawing copy-books. I prefer blank books, and then the teacher can modify any particular course to suit his own school. I would warn teachers against adopting a course consisting mainly of blobs. The children should, as early as possible, be allowed to work with the tip of the brush. It should be noticed that drawing from actual objects and memory drawing are specially named. Let me commend this to those whose drawing courses consist mainly of copying from the flat recreative studies.

Correlation of Subjects. Much stress is now being laid upon the drawing of the objects taken in the lessons on common things. This is excellent in theory, and with a capable teacher works out well in practice, but results in "confusion worse confounded" in many cases. Consider what is involved in such a correlation. Both drawing and common things must separately be taught in a logical manner. When the correlation takes place, one must be more or less subsidiary to the other. It generally happens that the common things syllabus is drawn up without reference to the drawing, and that subsequently the children are taught to paint or draw the objects dealt with. One day the boy in, say, Standard II. finds it an easy matter, having had an object lesson on an apple, to draw or paint the same. A few days later the same lad finds some difficulty in portraying the hedgehog! It seems obvious that either your nature lessons must be arranged to fit the drawing capabilities of your children, or else both subjects must be dealt with separately. Probably it might be possible to arrange a scientifically-graded nature course which might also allow for a subsidiary topically-arranged set of drawing exercises. I am a strong believer in co-ordination, but I am convinced that unless this is thoughtfully arranged more harm than good ensues. Again, there is always the possibility of correlation being overdone. I am reminded of the first-class infant who, upon being asked by his fond parent what he had been doing at school, said he had had a lesson on the carrot, drawn the carrot, modelled a carrot, recited about the same vegetable, until he was absolutely tired of school altogether.

Classification. For the first time the Code deals definitely with classification. We have infants under seven, younger scholars (from seven to eleven), and older scholars (above eleven). The instruction of the "younger scholars" is to be somewhat on the lines of that given to infants. "Part of the instruction of infants should be given by means of appropriate and varied occupations, and to a less extent the same methods should find a place in the teaching of the younger scholars." Unfortunately, I find too often the reverse of this—namely, the infant instruction

savouring too much of the old "annual visit" standard methods; for example, test cards, dictation, spelling, etc.

INSPECTOR'S "NOTEBOOK" QUERY COLUMN.

Letters should be addressed, "Inspector," care of the Editor, 35 Paternoster Row. In cases of urgency replies can be sent by post if two stamps are enclosed with an addressed envelope.

H. W. writes: "Are the hundred lines of Shakespeare for repetition in the Scholarship Examination to be continuous or not? If I can, I would prefer to select the lines from different parts of the play."

Answer.—You can select your hundred lines from all parts of the one play you are studying. You cannot take the lines from two or more plays.

"*Sompedes*" asks: "Will the A.C.P. qualify me for a mastership of a Board school? and shall I have a chance of obtaining such a situation, my work hitherto having been confined to secondary school teaching? If not, what position can I procure in an elementary school with the L.C.P.?"

Answer.—As you seem anxious to enter the elementary school teachers' profession, I advise you to buy an annotated copy of the current Code and study it carefully, especially Schedule I.

The A.C.P., or the first-class certificate of the College of Preceptors, provided that the candidate has passed in (1) English history or geography, and (2) in Euclid or algebra, would qualify you, if you are over eighteen, to be an assistant teacher in an elementary school. You could obtain a salary of £55 to start with, if you can teach. You would have a splendid chance now, as there is a great dearth of teachers. It would be necessary for you to pass the Government Certificate Examination or to graduate at a university before being eligible for a headship.

The L.C.P. would not be a substitute for either of these. I do not fancy this qualification would help you much in secondary schools, except to obtain a subordinate post.

D. N. M. writes to me from British Guiana for help in the matter of teaching object lessons, nature study, drawing, singing, and drill.

Answer.—I am exceedingly pleased to hear from so remote a reader as *D. N. M.*, and am only too pleased to help him in any way possible. By the time he reads this he will be in receipt of a reply from me. Let me add here, for the benefit of all our foreign and colonial readers, that I always endeavour to send a reply by post to *them*. Will they kindly enclose enough stamps to cover the cost of a double reply, as my letters to countries abroad generally weigh more than half an ounce?

THE NEW SECRETARY OF THE SCOTCH EDUCATION DEPARTMENT.—Mr. John Struthers, C.B., has been nominated to be Secretary of the Scotch Education Department and Director of Higher Inspection in Scotland, upon the retirement of Sir Henry Craik, K.C.B., which takes place on December 22.

Mr. George Todd, I.S.O., is appointed First Assistant Secretary, and Mr. George Macdonald is appointed Second Assistant Secretary, with headquarters in Edinburgh.

SECONDARY EDUCATION IN LIVERPOOL.—We have received a copy of the report by Professor Sadler on secondary education in Liverpool. It treats in an exhaustive way of the existing condition of secondary education, and contains some valuable suggestions for its improvement. The difficult question of the supply and training of teachers for the elementary school is treated at considerable length, and certain weaknesses in the new regulations are pointed out. The School of Art, School of Commerce, and the Central Technical School are all carefully reported upon, and educational committees in all parts will find much guidance in the volume

SERIOUS PLAY.

ORGANISED GAMES IN SCHOOLS.*

BY FRANK ELSTON.

MUCH attention has recently been directed by the Board of Education, and by the various societies connected with or interested in the physical development of the young, to the necessity for serious consideration of the means afforded and put into practice for the attaining of this end, more particularly in the case of those children who attend our elementary schools, and who are to become in the future the backbone of our nation.

That the physical development of our children has, during the last decade, received some practical recognition from those interested in their wellbeing is not to be denied; but whether full advantage has been taken of the opportunities afforded to educational authorities in their dealings with large bodies of children, of varying mental, moral, and physical capacity, to train the body as they have undoubtedly trained the mind, is perhaps a debatable point.

The true educationist turns to profitable account the *natural instincts* of the child in the endeavour to draw out the powers of the mind. Surely these instincts may be advantageously harnessed to train the body. It is as natural for a child to play as for a duck to swim. All children are endowed with "animal spirits," certainly of widely different character, which, if properly directed and controlled in play, may reasonably be expected to produce lasting physical and moral effects. And who is so well fitted to direct and control this natural inclination to play, in order to get the best out of it, as the teacher, to whom it is almost second nature to treat all subjects in an interesting and acceptable form, as far as the children are concerned? It is to this particular form of physical exercise that the writer would direct attention.

The recent "Report of the Inter-Departmental Committee on the Model Course of Physical Exercises" states that "exercises involving the whole bony and muscular structure of the body, and which quickly and powerfully affect both respiration and circulation, are to be found in the natural play movements of children—running, leaping, skipping." Further, to secure this desirable exercise, it suggests that "wherever opportunity offers, children should be encouraged to take part in all manner of running games *in which a considerable number can engage at the same time*, and for girls the exercise of skipping particularly should be encouraged."

Assuming, then, that play may tend to bodily development, and that games, to a child, are a pleasant means to this end, what remains to be done in order that the result shall be the most effectual and the most beneficial? The teacher must organise the games—that is, select, direct, and control them in the same manner as he does the other subjects of school routine.

The aimless nature of the play of children when left to themselves is very apparent, whether in school playgrounds, in public playgrounds, or in the streets. A school of four hundred boys at "play" in a fine up-to-date playground reveals something like as follows:—

The main space is probably occupied by a score or so of boys engaged at football or cricket, which games may or may not be supervised by an interested teacher.

* *Organised Games for Schools.* By Frank Elston. (E. J. Arnold and Sons, Limited, Leeds. 3s. net.)

Round the walls are seen the non-playing critics and admirers. Nervous and sensitive boys avoid the open spaces, while in odd corners may be found small groups playing for cherry-stones, marbles, cigarette pictures, in most cases mild forms of "gambling." Many wander aimlessly about, with no particular interest in any form of play, while spasmodic attempts at local games by some boys command pity rather than pleasure. Girls, too, are similarly backward in this respect.

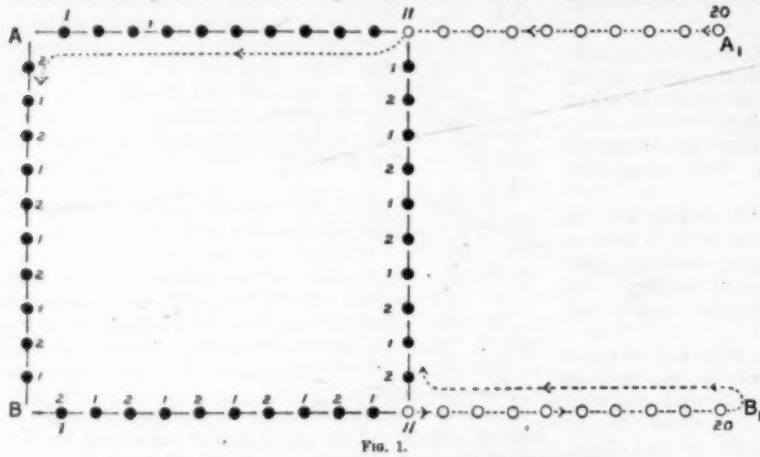


Fig. 1.

A A_1, B B_1—Class in open order formation at single distance.
– – – – – – – – – – Directions taken by 11–20 to form the square.
–. –. –. Class in square formation, numbered in twos.

Is it not possible to bring all these elements together along the line of least resistance—to bring the robust to play with the nervous, and to show the uninterested and lackadaisical the delights and usefulness of bodily exercise? Would not an occasional well-devised and efficiently-controlled *lesson* in play be of physical and moral benefit to any class, and also to any school as a whole? Qualities which make the "manly" man—self-reliance, self-restraint, consideration for others, tact, judgment, etc.—cannot fail to be brought out when boys play in large numbers, and the effect is equally well marked in the case of girls.

Organised games may be made a valuable adjunct to the recognised physical exercises, and at the same time an appreciated relaxation from the "cast-iron" precision of the latter, as well as a means of bringing the children and the teacher into closer *touch* with one another than any branch of school work renders possible, and thus forming a very real and valuable aid to maintaining a good tone and discipline in the class or school. "Serious play," in which children's games are served up amid the rigours of school discipline, and presided over by their teachers, should do much to ease the paths of all concerned.

Having shown the necessity and advantages of organised games for schools, we shall proceed to show how a series of familiar games can be played in an eminently practical way by any class, however large it may be. Size, age, and sex will, of course, determine the nature and physical suitability of the games; but up to the age of fourteen years there need be little distinction with regard to sex. Owing to the variation of height, more particularly in the upper classes, sizing is necessary to ensure that children play with others of the same, or nearly the same, height. Then, again, some systematic formation, simple, and easily carried out, is required as a foundation for games. In this formation the children occupy the same positions regularly, taking them up at once whenever called upon to do so.

Fig. 1 A A_1, B B_1 shows diagrammatically a class of forty children sized in two ranks, the ranks being opened out to twelve (or more) paces, and the children in each rank extended at arm's length from each other. This formation is known as the "open order formation," and may be used as a basis of many games, as will be shown later. It can be quickly changed into a square or oblong to suit the shape of the room, hall, etc., where the play takes place.

The square is a convenient formation for most games, and can be readily changed into a circle when occasion demands.

Fig. 2 shows a class "proving" previous to commencing a game. It should be mentioned that all preliminary movements are carried out as drill with smartness and precision.

To commence with the "open order formation," let us suppose the two lines A A_1, B B_1 (Fig. 1) are numbered off in "twos." The order "Single Driving—Ready" being given, the children turn right or left, as the case may be; "twos" take the tails of "ones," and we have twenty pairs, a horse and driver in each pair. At a further word "Go" each pair runs independently about the playing space till all are recalled to their original places by the whistle or by word of command. This will be found a useful preliminary to the ordinary lesson in physical exercises.

Fig. 3.

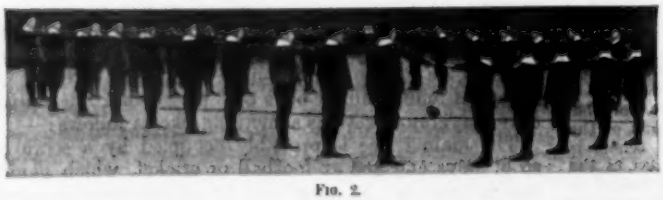


Fig. 2.

Fig. 3 shows two games played in the "open order formation"—namely, "French and English" and "Fire Rescue."

In "French and English" the whole line of "attackers" runs, each child to its *vis-à-vis*, to the "attacked," whose outstretched palms they strike, and then endeavour to regain their line without being captured. If caught, the attacker becomes the prisoner of the attacked, and is taken back as such; but should the attacker reach his line without being caught, then the pursuing child becomes

a prisoner. Prisoners are counted, and the winning side is announced.

In "Fire Rescue" one line is named "rescuers," and

Fig. 4.

the other "rescued." At the word (or whistle) the rescuers run, each to the child exactly opposite, and carry back the rescued "pick-a-back" or "baby" fashion. Older children may be taught various methods for carrying helpless persons. In both "French and English" and "Fire Rescue" the actions are reversed—that is, "attackers" become "attacked," and "rescuers" become "rescued" in turn.

Fig. 4 illustrates the use of the square (or oblong) as a foundation for games. The game shown is "Jumping the Hedge." The "hedge" is a rope held at either end by two children so as to bisect the square (or oblong) diagonally. This rope is gradually raised, an inch or so at a time, while the children, running as shown, jump the "hedge" as they pass the centre of the square. After sufficient exercise, the whistle or word of command recalls each child to its original position in the square formation.

"Leaping the Ditch" is played similarly. The "ditch" is the distance between two ropes laid parallel

Circular Swing. Overhead Twist.

Catherine Wheels. Fig. 5. Raising the Flour Sack.

on the ground, one of which can be moved by children placed for that purpose so as to increase the width of the ditch. The children, again forming two separate parties, run round in two right-angled triangles, leaping the "ditch" at the centre of the square.

Fig. 6.
Hunt the Squirrel.

Fig. 5 illustrates four games. "Catherine Wheels" is a favourite game of boys of the robust type. It is best carried out in the "open order formation" (Fig. 1) to ensure safety. Nervous boys may watch their more agile companions for a time, and so gain confidence.

"Raising the Flour Sack." Either formation is suitable for this, and also for "Circular Swing" and "Overhead Twist." The children having smartly formed themselves into pairs according to drill-like movements already learnt, lock arms at the elbow while back to back. They then lift each other slightly and gently.

"Overhead Twist." In this game the children of each pair, again back to back, clasp hands over their heads and then pass their heads under their arms, continuing until the whistle sounds.

"Circular Swing." The children in each pair turn to face each other, forming couples all round the square, and clasp hands firmly with arms fully stretched. Each pair then turns round on its own base. In the latter two games reversing after a short time will prevent giddiness.

Fig. 7.
Individual Skipping.

So far we have described games in which children play (1) individually, (2) in pairs, (3) in small parties. Fig. 6 shows a round game—"Hunt the Squirrel."

The square formation is turned into a circle by the children, who join hands. Two or more children have been withdrawn to act as "squirrels." Each "squirrel," proceeding round the outside of the circle, touches a child lightly on the shoulder, and then runs in and out under the outstretched hands pursued by the child touched. The "squirrel" takes a vacant space if he can without being touched. If a "squirrel" is caught, it has to proceed as before, while the pursuer joins in the circle. If, however, the pursuer fails to capture, he becomes a "squirrel," and acts accordingly.

That skipping is a beneficial form of exercise for both males and females in early youth is generally admitted. Children may be induced to provide themselves with ropes, but we are of opinion that such useful apparatus should be supplied by school authorities.

Fig. 7 shows a class ready for "individual skipping." Forward and backward skipping, skipping on each leg alternately, etc., can be indulged in at will. A much-enjoyed preliminary is an independent running skip by each child till recalled by the whistle. Skipping-ropes may be used for "single driving," instead of taking "tails" as described above.

Another useful form of skipping is shown in Fig. 8—"combined skipping." The square formation is used, and each side becomes a separate skipping party. For little children the ropes may be swung gently to and fro while each child in passing jumps over it.

The average boy will revel in the delights of "Leap Frog" or "Pick-a-back" under almost any conditions;

but when the games are well directed and controlled, even the most reticent boy is induced to participate to his own amusement and physical advantage. "Kangaroo Dance" (Fig. 9) is a game such as any teacher

Fig. 8.

might "invent" and organise as a result of watching the uncontrolled play of children.

Such, then, are a few of the many well-known games of children, which, when carefully organised by the observant practical teacher, may lead to moral and physical results hitherto little thought of. A quotation from the report of the English Commission on Physical Exercises in Schools is given above. In conclusion we quote from the report of the Scotch Commission appointed for a similar purpose:—"Games are very useful, and certainly ought to be encouraged.....They form an admirable field for the cultivation of social and public spirit. We strongly favour their organisation and development at all schools."

Kangaroo Dance.

Leap Frog. Kangaroo Dance. Pick-a-back.

Fig. 9.

A NEW RECITATION.

(For Class III. and Upwards.)

SIR PHILIP SIDNEY.*

HEARD ye of Sidney—Sir Philip Sidney?
Bold as a lion and sweet as a maid,
Soldier and poet—do ye not know it?
Glorious alike with the pen and the blade.

Heard ye of Sidney—Sir Philip Sidney?
Prince of all knights at the court of Queen Bess,
Pure, tender, and strong; his whole life a song,
Pattern and mirror of rare manliness.

Heard ye of Sidney—Sir Philip Sidney?
Men from afar bade him sit on a throne.
"Rule ye fair Poland." "Nay," said he; "for no land
Can reave me from this land, from England, my own."

Heard ye of Sidney—Sir Philip Sidney?
'Midst Zutphen's red carnage sore wounded he lay;
While panting for breath, in the fever of death,
Water they brought him his thirst to allay.

Heard ye of Sidney—Sir Philip Sidney?
The goblet of blessing he fain would have quaffed,
But a soldier he spies, with agonised eyes,
Yearning to slake his parched lips with the draught.

Heard ye of Sidney—Sir Philip Sidney?
Gracious in life, and in death how benign!
Yea, dying, he said, "Take it yonder instead.
Thy need, O my comrade, is greater than mine."

I've told ye of Sidney—Sir Philip Sidney—
Foe to all baseness, dishonour, and greed.
O child of his race, strive ye for the grace
To imitate Sidney in thought, word, and deed.

Edward Shirley.

* All rights reserved.

The Study of Ants.—In our August number we gave an account of the life-history and habits of the ants, and many teachers have desired to set up an observation nest of ants, but have found it difficult to secure a stock. They will be glad to know that such nests may now be purchased from Messrs. Gamage and Co., Holborn, for the small sum of twelve shillings and sixpence, neatly installed in a glass case.

Each case is about a foot square, and contains about a quarter of an inch of sterilised earth, so that no noxious fungoid growths can harm the colony of ants. The case should be set in a horizontal position, and, except when under observation, covered with a piece of American cloth or some other opaque material. The habits of these industrious workers may be studied by the children. Although there is no fear of the glass plate falling in, yet the ants leave pillars of earth to support it, just as they do in their own nests. The care bestowed upon the larvæ, or "eggs" as they are often erroneously called when used as food for birds and goldfish, is one of the most interesting things to notice. If an ant's nest is disturbed so that there is any fear of injury happening to these grubs, each working ant will seize the one nearest to it and hurry off to a place of safety.

The ants require practically no attention; just a little honey, or a little scrap of almost anything that is eatable, will last them for a long time.

Is a Teacher a Gentleman?—An interesting question was recently raised at Southend-on-Sea County Court over the question whether a schoolmaster, who had appeared as a witness in a case, should be awarded costs on the scale of a professional man or gentleman, or on that of the tradesman, which is lower.

The solicitor who applied quoted the definition of a gentleman given in the dictionary: "One who by education, occupation, or income, holds a position above menial service or ordinary trade." The judge remarked that a draper might have an income of ten thousand a year, have been educated at the university, and in society be a perfect gentleman, and yet would not be a gentleman in the meaning of the court. The solicitor, however, pointed out that the possession of a university degree gives the holder the legal right to the title of gentleman. In this particular case the schoolmaster had no university degree, and hence received costs on the lower scale. The judge's sympathies were evidently with him, and he remarked that "no schoolmaster must think he is insulted in any way."

"The American Sunday-School Times."—To our readers who are interested in Sunday-school work this journal should prove exceedingly helpful. In appearance it is a change from the kind of papers we are accustomed to see on this side of the Atlantic, and many teachers, we feel sure, will be glad to examine a specimen copy. There is an instructive series of papers on the "Training of Teachers," by Professor Martin G. Brumbaugh. Outline lessons, hints, graded helps, etc., appear week by week. For information relating to subscription rates application should be made to T. French Downie, 14 Paternoster Square, London, E.C.

Our Modern Language Section

ON THE STUDY OF GERMAN.

VI.

THE student of Latin and Greek is familiar with the idea of prepositions governing certain particular cases. The English student who has not this advantage must, in studying German, get rid of the idea that the preposition always governs what many English grammarians call the objective case.

In German, prepositions may govern the genitive, the dative, or the accusative case. Again, some prepositions, according to their signification, govern either the dative or the accusative. Furthermore, two prepositions, *trotz*, "in spite of," and *längs*, "along," may be used with either genitive or dative. Again, there are certain prepositions which regularly follow their substantive, and there are others which *may* be placed in this position. Those whose position is thus optional are *wegen*, "on account of;" *zufolge*, "in accordance with;" and *nach*. We have given no rendering of the last of these three, as when it *follows* its substantive it always means "in accordance with," and when it precedes it has the same signification, or the signification of "after." Thus *nach ihrem Bruder* is "after your brother," and *dem Befehle nach* is "in accordance with the command." *Zufolge*, when it precedes its substantive, governs the genitive; following its substantive, it does not alter in meaning, but governs the dative. *Wegen* always governs the genitive, and the position in which it is placed does not influence its meaning.

The student of Latin will have no difficulty in assimilating the rule for the prepositions which, according to meaning, govern either the dative or the accusative. These prepositions are *an*, *auf*, *hinter*, *in*, *neben*, *über*, *unter*, *vor*, and *zwischen*. When these prepositions denote *rest* in a place, they govern the dative. When they denote *motion*, either physical or mental, directed towards a place or person, they govern the accusative. *Ich stand an der Thüre und klopfte*, "I stood at the door and knocked;" but *Ich stelle mich an die Thüre*, "I place myself at the door." In the first case there is physical *rest*, in the second *motion*. Again, we should say, *Er sitzt über den Büchern*, "He pores over his books;" but *Ich sprach meine Meinung über ihn aus*, "I expressed my opinion of him." In the former case there is physical *rest*, in the latter case there is mental *motion*.

A difficulty in mastering the cases governed by particular prepositions is that, although originally in all probability the prepositions which governed these cases possessed significations falling within the fundamental ideas denoted by the cases, yet in course of time the effect of two processes which went on slowly combined to cause in some cases a want of harmony between the meaning of the preposition and the root idea of the case. Modifications gradually arose in the meaning of prepositions, and prepositions which originally governed a particular case became by force of usage attached to other cases with or without modification of meaning. Hence it is absolutely necessary to memorise the cases governed by prepositions, and to drill oneself constantly in their use. Steady reading will in time fix indelibly on the mind the cases prepositions govern, and render the pupil not only correct in their use, but enable him to use them with fluency and ease.

As we do not intend in this series of papers to usurp the functions of the exercise book, but only to give some helps to its use, we do not intend to give a list of the prepositions governing particular cases. One caution, however, is absolutely necessary. The student must not imagine that in learning the limited meanings given to prepositions in the grammar he is learning all about them. Thus *um* means "round," and this is the meaning usually given. The student will, however, find that it means "about," in the sense of the interest one takes in a person or thing. Again, *über* is usually given as meaning "over," but *Ich reise über Berlin* does not suggest a balloon voyage. It means "I come *viâ* Berlin"—that is, taking Berlin on my route. The belief that the grammar book tells the student all that can be known of the meanings of prepositions is responsible for many serious failures in translation. Several prepositions, as *ob* and *halber*, are rather antiquated in usage. *Gegen* has a contracted form, *gen*, used poetically; and the compound preposition *um..... willen* demands careful attention. The substantive, governed in the genitive, is placed between the two words, as *um meiner Ehre willen*, "for the sake of my honour."

(*To be continued.*)

ON A UNIVERSAL LANGUAGE.

MANY of our readers have no doubt had the experience of finding themselves alone in the streets of a foreign town, surrounded by people speaking a language with which they were entirely unfamiliar, and between whom and themselves the lack of a common medium of intercourse set up an almost insurmountable barrier. A person feels utterly helpless under such circumstances, and at such times one is disposed to welcome the idea of a universal language which should remove one of the greatest inconveniences which travelling abroad brings with it.

Statistics tell us that whereas our own language some hundred years ago took only a low place among the languages of the world with regard to the number of people whose mother-tongue it was, it now takes the second place, and our swelling pride encourages us to look forward to a time when English will be the *lingua*

franca of mankind. Our own colonial development, our world-wide commerce, and the unparalleled growth in population of the United States, account for the increase in numbers of those who speak English, just as territorial development accounts for the increased spread of the Russian language. If territorial development were everything, a reformed Russia, with an educated people making the greatest use possible of the mineral treasures of the empire, might cause Russian to be spoken by still many more millions than speak it now. But Russian, with its peculiar alphabet, its pronunciation almost as irregular as our own, its seven cases and nine declensions of nouns, its variations of verb termination according to the gender of the subject, is a heavily-handicapped competitor with our own simple language, almost without inflections, and allied by its vocabulary to the two most important branches of the Indo-European—should we say Indo-Germanic?—family.

But while it will always be an interesting subject for speculation whether English will ever become the universal language, the consummation which would relieve the English traveller from the perplexities which await him when travelling will only happen in a very dim and distant future.

Can nothing be done to give immediate assistance to the perplexed national, be he English, French, German, or any other? Spontaneous efforts have resulted in the birth of hybrid languages, like the "pidgin English" spoken in the Chinese ports, the *lingua franca* of the Mediterranean, and other similar productions on the border-lines of countries where different languages are spoken. But these only meet local difficulties. Can nothing be invented to meet a world-wide difficulty? Can a new language, avoiding the irrationalities and stumbling-blocks of languages of natural growth, be devised? and if so, what are the possibilities of its universal acceptance? A living body cannot be artificially produced; for while we know a great deal about the elements of which it is composed, we cannot form combinations of these elements which shall reproduce the tissues which form the body, nor can we endow it with the mysterious quality of life. It is almost as impossible to reproduce artificially the food-stuffs which nourish the body. But there are no secrets in language. The noun and the verb are essential and necessary parts of the mechanism of speech, and the symbols for the thing *man* and the idea *exists* need not necessarily be these two words, provided only that there is a general agreement as to the symbols we shall choose to use in their places. So also with the processes of inflection and derivation. If only there is a general agreement as to the terminations we shall use, any others than those we actually use would suit our purpose just as well. There are no great difficulties in constructing an artificial language. The main difficulty, it seems to us, is in securing its extended acceptance. The language is moulded by the race, and in its turn moulds the mental characteristics of the race which speaks it. Sometimes a master-mind arises and bends the language to his own will. After having passed through his hands, it emerges, having gained new powers, and being capable of more fully expressing human thoughts and voicing human aspirations. In its development it becomes capable of being made the vehicle of written thought in every possible literary form. Are there possibilities of this kind in a language mechanically contrived? Probably those who are striving to secure the acceptance of a universal language have no such lofty aspirations, and have in view only a common medium for business purposes.

A few years ago we heard a great deal of Volapük, an artificial language which has gone right into the background, leaving only Esperanto, an older production, as a claimant for universal acceptance. This language was devised by Dr. Zamenhof, a medical man of Warsaw. It has twenty-eight letters, and is absolutely phonetic in pronunciation. The vowels are French, the consonants mainly sounding like our own—*j* has the German sound. The roots are chiefly Latin, and words can be abundantly formed from these by means of suffixes. All nouns end in *o*, adjectives in *a*, adverbs in *e*, and infinitives in *i*. The verbs are regular, and have neither number nor person. It is claimed that enough of Esperanto can be learned in an hour to enable a person to read articles in it with the help of a dictionary. A large number of centres have been formed for its study in Europe. *The Esperantist* (price 4d.), published by the London Esperanto Club, 21 Outer Temple, has been established to advocate its claims. Whilst Esperanto has yet to stand the test of time, it seems to us that there is a great deal to be said for it.

FRENCH PRIZE COMPETITION.

RULES.

1. All translations should be **posted not later than January 8, 1905,** and addressed:—PRIZE EDITOR, Office of the *Practical Teacher*, 35 and 36 Paternoster Row, London, E.C.
2. Competitors should cut out and send the Coupon which appears on the Back Wrapper page of the current number.
3. Competitors should write pseudonym only on MS. Prize-winner will be asked to send name and address for publication.
4. No competitor may take the prize offered more than once in three months.

A Prize of Half a Guinea is offered for the best rendering into English of the following extract:—

M. Thiers n'a pas dédaigné, dans une préface devenue célèbre, de nous faire connaître quelles sont ses vues sur l'art qu'il a porté si haut. Il réduit tous les dons de l'historien à un seul, la sagacité; tout l'art d'écrire l'histoire à une seule qualité, l'ordonnance; toutes les conditions du style historique à une seule, la clarté. On sait de quelle comparaison ingénieuse il s'est servi pour mieux rendre sa pensée. Le style, selon lui, doit être comme l'une de ces glaces sans tain que l'industrie moderne a appris à couler et à travers lesquelles on aperçoit les objets si nettement que le spectateur se doute à peine qu'il y ait quelque chose entre lui et eux. Le premier mérite du style, au jugement de M. Thiers est de n'être jamais aperçu, la qualité suprême de l'art est de se dissimuler lui-même. M. Thiers a si bien réalisé son idéal qu'on est tenté de se demander si cet idéal est autre chose que la théorie de son propre talent. Ce qui est certain, c'est que l'art de notre écrivain est bien celui qui paraît consister dans l'absence de l'art, son style celui qui ressemble le plus à l'absence du style. Il a merveilleusement réussi, selon son expression, "à être simplement vrai." Il raconte comme jadis il parlait à la tribune; après avoir étudié son objet sur toutes les faces, dans tous les détails, il s'y livre, il laisse les choses se reproduire dans leur ordre naturel, il va, va toujours réfléchissant, dans le courant de son limpide récit, tous les contours et tout le mouvement des faits.

EDMOND SCHERER.

The Editor regrets that owing to the great pressure on the space, and to the necessity of going to press early so that the magazine may be published before the Christmas holidays, the French Prize Competition has been held over: but the results of both the December and January competitions will be announced in our next issue.

The Practical Infant-School Teacher.

HIAWATHA FOR THE INFANTS.

EDUCATIONISTS have for some time past strongly advocated the application of the Froebelian principles of "concentration and co-ordination of studies" to the work done in schools. That all the lessons should be grouped round one common centre or starting-point, and all made to bear upon the same subject, is in direct opposition to the old practice of shutting up each subject in a water-tight compartment of its own, as if it could have no connection whatever with other subjects taught in the school. The selection of a suitable centre or starting-point for a course of lessons often presents a great difficulty to the teacher.

Longfellow's *Hiawatha*, as a subject for school study, sounds rather above the grasp of children in infants' schools. The writer, however, used the poem for a starting-point, and based a course of lessons for the first class infants upon it last year, and found the experiment a most successful one. The scheme proved most interesting to both teacher and class. The poem, being, as it is, the story of the infancy of the race as illustrated in Indian life, and telling of its gradual transition from rude untaught savagery, ignorance, superstition, and wild imagination to the arts of peace, to knowledge, to right living, and to self-government, follows the same path along which all true education must proceed. "What is true of the race is true of the individual," and the young child in his wild imagination, personifying everything with which he plays, attributing to inanimate things the powers of speech, thought, and action possessed by people around him, resembles the rude and untaught savage—nature's child. The aim of the teacher is to convert this "young savage" into a right-thinking, right-living, and self-governing individual, to attain which end he has to pass through similar stages as did the race towards its civilisation.

The poem forms an excellent centre around which to concentrate a very comprehensive scheme of varied lessons, for it overflows with suggestions, and is bursting with the richness, beauty, and fullness of nature in all its branches. The story of the Struggle of the Winds and their final separation, for example, suggested a series of *nature lessons* on the winds and their work, on the rising and setting sun, and on the seasons, with the characteristics of each. This was followed by *painting* scarlet berries, autumn leaves, forget-me-nots, or dandelions; by *drawing* shells for the belt of wampum, a fish, or a weather-vane; by *modelling* shells, berries, grapes, or any fruit of the season. For *recitation* the little piece called the "Fairy Artist," describing the work of Jack Frost at night, was learnt; while the struggle of Mudjekeewis with White Bear provided a good *game*, to be acted by a few children before the rest of the class. Again, the story of Hiawatha's Boat Building led to a course of lessons on forest trees and how to distinguish them, with the particular use of each tree—for, as Longfellow says of the canoe, "The forest life was in it;" on boats and ships, from the canoe of Hiawatha to the men-of-war and ocean liners of to-day. This latter proved most interesting to the little ones, who were full of questions about the life on board ship, asking where the people slept, how they made tea, had they a kettle on board, etc. After drawing, modelling, painting, or folding leaves, trees, boats, ships, or canoes, collecting, pressing, and mounting leaves, the children acted a shipwreck, and gallantly pretended to man a lifeboat, and put out to rescue the drowning men and women.

The history of Hiawatha, again, puts high ideals before the children without thrusting the inevitable moral objectionably to the front. The moral teaching is in the stories themselves, and the class feel it as they listen to the stories: for example, to the story of Hiawatha's fasting for the good of the people, and of his struggle with and conquest of Mondamin—a story full of the reward gained by continual unselfish work and steady perseverance. Then the story of Hiawatha's friends—of the gentle, sympathetic Chibiabos, "brave as man is, soft as woman," and of "the very strong man Kwasind"—presents a beautiful picture of ideal friendship, for it is full of love and trust and helpful, ready sympathy. Again, the story of Hiawatha's childhood, with the love and care of old Nokomis for the baby Hiawatha, made the children feel that he was a child like themselves, and aroused a feeling of charity towards mankind within their little minds which was fostered throughout the whole course of lessons.

The children enjoyed the lessons because they were of things familiar to them, yet wrapped about with that strangeness and mystery so dear to child mind. In the continued history they found answers themselves to their own eager questions: What did Hiawatha do next? What did he eat? Where did he get his meat? What was old Nokomis like? Their interest, once aroused, was thus easily maintained by the almost inexhaustible mine which had been opened for them, and into which they longed to dip deeper and ever deeper. They were intensely pleased when able to describe anything themselves. One boy, for example, after hearing the story of Hiawatha's childhood, proudly exclaimed, when the cradle was subsequently mentioned, "Yes, I know how old Nokomis made the little baby's cradle;" and in response to an invitation from the teacher, he proceeded to tell, in detail, how the bark was stripped from

the trees and the cradle made, while the class listened attentively, ready to correct mistakes and to supply omissions.

The stories were made the centre or starting-point of the work from which all the other lessons sprang. These were told, as far as possible, just as Longfellow tells them, the teacher quoting largely from the poem itself. In the story of the Peace-Pipe, for example, the words the Master of Life addressed to the assembled warriors were read to the children; as was also Longfellow's perfect description of maize, the youth Mondamin, when the story of the first corn-growing was told to the class. That the children understood the language of Longfellow and entered into the spirit of the history was proved by the ready manner in which they retold the stories, often using phrases from the poem quite correctly, and by the suggestions they offered when subsequently acting the stories.

A model of the prairie was made, a doll dressed, a wigwam raised, and animals and trees from the Noah's ark, etc., added as the story went on. This proved intensely interesting and exciting to the class, who love to see anything grow into shape, and enjoy taking part in it themselves.

The teacher commenced with the story of the Peace-Pipe. The children had previously had lessons on woods and forests; therefore, after a few remarks about the forests and prairies, the story was told. A brief sketch of the chief points taken is given.

Story.—The teacher told how the Red Indians were savages, living in tents or wigwams in large forests and prairies; how they were divided into tribes, each with a leader of its own, and all the tribes were subject to the Master of Life. How these tribes were continually quarrelling with one another, and had been doing so for years and years, as had their fathers and grandfathers before them; how the Master of Life was grieved with this continued strife of ages; how

> "From the red stone of the quarry
> With his hand he broke a fragment,
> Moulded it into a pipe-head;"

and having made a pipe, smoked it "on the mountain of the prairie," the smoke calling the men of the tribes together, calling the "warriors to his council." How they came from all parts of the prairie to the "great Red Pipe-stone Quarry,"

> "And they stood there, on the meadow,
> With their weapons and their war-gear,
> Painted like the leaves of autumn,
> Painted like the sky of morning,
> Wildly glaring at each other."

How the Master of Life came down from the mountain, looking upon the assembled warriors with love and pity, thinking sadly of their quarrels; how he urged them to cease from all their strife. The teacher here gave the speech of the Master of Life in Longfellow's own words:—

> "O my children, my poor children!
> Listen to the words of wisdom.....
> Therefore be at peace henceforward,
> And as brothers live together;"

and further:—

> "Bathe now in the stream before you.....
> And as brothers live henceforward."

And again the teacher read how the warriors "leaped into the rushing river," and how they came out

> "Clean and washed from all their war-paint;
> On the banks their clubs they buried,
> Buried all their warlike weapons,
> And in silence all the warriors
> Broke the redstone of the quarry,
> Smoothed and formed it into Peace-Pipes;"

and told how they smoked the Peace-Pipe together, while the Master of Life went away with the smoke, and the warriors departed, each to his own home, henceforward to live as friends and brothers.

The story of the Peace-Pipe suggested the following among many lessons which might be given in connection with it:—

General Information Lessons on clay, stone, quarry and quarrying; riverside plants—reeds and rushes; Red Indians—their home, habits, dress, food, occupations, etc.

Drawing.—A pipe, any tool used in quarrying, wigwam, bow and arrow, spear, etc.

Brush Work.—Reeds and rushes, iris, feather, pipe.

Clay Modelling.—Peace-Pipe developed from the cylinder, using a quill for the stem, Indian club, cradle, etc.

Paper Folding.—Tent with quills for the poles and pins for the pegs.

Writing.—A shortened story, given in the children's own words, copied from the blackboard from day to day. For example—"The Red Indians were savages. They had been bad friends for years and years. This grieved the Master of Life. He called them to him and talked to them. They then smoked the Peace-Pipe together, ended their quarrel, and were good friends."

Reading.—Any piece from the class readers bearing upon the lessons; for example, about stone and quarrying, clay, fishing, etc.

Game.—The story of the Peace-Pipe acted upon some such plan as the following:—

The acting was done by the boys alone; the girls represented the women, and remained at home in the wigwams, pretending to do the work of the Red Indian women learnt in the lessons—cooking the meat, attending to the baby, preparing skins, getting the men ready to obey the call of the Master of Life.

The hall represented the forest in which were the wigwams (children in groups as families and tribes). The river was marked off on the floor.

One boy was the Master of Life. He walked in, as if from a distance, took clay and moulded a pipe, using a quill for the stem. He then pretended to smoke his pipe, saying the smoke rose higher and higher, now a thin line, now so large a cloud that all the tribes would be able to see it. The warriors, watching and listening in their wigwams, obeyed the call, and gathered round the Master of Life, bearing their weapons (pointers, brushes, etc.), and "glaring wildly at each other." The Master of Life then addressed the assembled braves, giving the substance of the speech in his own words. The warriors then bathed in the river, left their weapons on the banks, gathered round the Master of Life, and smoked the Peace-Pipes made in the modelling lesson, while he passed away with the smoke. The warriors returned to their homes, good friends and like brothers, left their weapons on the banks, and thus ended the "strife of ages."

The children were very ready with suggestions for the parts to be taken and characters to be represented, and entered into the true spirit of hatred at the first, and later of friendliness towards each other. The Master of Life was a "leader" indeed, and delivered his address in a right masterful manner, commanding the cheerful obedience of the young savages gathered around him.

The class followed the history with great interest and sympathy as it continued from day to day, and gradually added knowledge to knowledge. Good habits of continued application and concentration of thought were thus started, and a love of history created, which cannot fail to be useful and pleasurable to the children throughout their lives.

A Brief Scheme of Lessons based upon the Poem as described above.

1. *Story.*—The Peace-Pipe, as given above.

2. *Story.*—The struggle and final separation of the Four Winds, with the capture of the Belt of Wampum from White Bear by Mudjekeewis the West Wind, the "Father of the Winds of Heaven."

General Information.—The winds and their work; the weather-vane and its use; sunrise and sunset, with the great work of the sun upon all nature; the woodcutter and his work; the bear; the diver, his dress and work.

Drawing.—A weather-vane, shells, bear, saw, chopper, fish, leaves.

Brush Work.—Weather-vane, forget-me-nots, autumn berries, autumn leaves, dandelion, fish, apple, etc.

Modelling.—Shells, grapes, string of fish, berries, etc.

Recitation.—The fairy artist.

Song.—"Pretty little Goldilocks."

Game.—The struggle of Mudjekeewis with White Bear for the Belt of Wampum, acted before the class by a few children.

3. *Story.*—The story of the childhood of Hiawatha, spent in the great prairie under the care of old Nokomis, with the visit of Iagoo the story-teller to the wigwam, and Hiawatha's first hunt.

General Information.—Lessons on the pine and fir trees; the owl, and other night birds; the reindeer; squirrel; rabbit; hunting, then and now.

Drawing.—Bow and arrow, acorn, rabbit, etc.

Brush Work.—Oak leaf and acorn, rabbit, egg.

Modelling.—Cradle (from the cylinder), acorn, bird's nest and eggs, etc.

Singing.—Hush-a-bye, baby, or any lullaby.

Game.—Shooting at a target in turn with a bow and arrow.

4. *Story.*—The story of Hiawatha's journey to the "kingdom of the West Wind" when he had grown to manhood, and of his meeting and struggle with Mudjekeewis, to avenge the wrong done to his mother, with his visit to the "ancient arrow-maker," where he first sees Minnehaha.

General Information.—Lessons on Hiawatha's clothing, which was all procured from the prairie, compared with our own manufactured and prepared materials; trading, then (the exchange of goods) and now; the eagle; a river, with its bridges, fords, falls, etc.

Drawing.—Bridge over the river.

Brush Work.—Bulrushes, or any riverside plant.

Modelling in Sand.—Mountains and hills, with a river-bed crossed by a bridge, built with Gift IV., and stepping-stones, etc.

5. *Story.*—Hiawatha's fasting for the good of the people, and his repeated wrestlings with the youth Mondamin and ultimate victory, which led to the introduction of agriculture.

General Information.—Lessons on pigeons; wild duck, and other water fowl; Indian corn, and other grain foods, with their sowing and uses.

Drawing.—An ear of wheat and oats, sickle, etc.

Brush Work.—Maize, oats, wheat.

Modelling.—Grindstones, scythes, cottage loaf, sack of flour, etc.

Recitation.—The "Little Plant."

Paper Folding.—Shovel, from the oblong.

Game.—Where sweet peas and barley grow; There was a jolly miller. Seeds sown, which the class could water and observe from time to time as they grow.

6. *Story.*—Hiawatha's friends—Chibiabos the gentle musician, and the very strong man Kwasind; how they trusted and helped one another.

General Information.—Lessons on the voices of nature, and how we hear them.

7. *Story.*—The story of Hiawatha's boat-building and his sailing.

General Information.—Lessons on trees, and how to distinguish them by their leaves, with their several uses—special reference to the oak tree; canoe; boats, ships, steamers; the hedgehog.

Drawing.—Ships and boats.

Brush Work.—Leaves of various trees.

Modelling.—Boat; canoe; hedgehog, using sticks for quills.

Paper Folding.—Boats, with and without a sail, and a pair of boats, from the square of paper.

Paper Ball Making.—A spiked ball to represent the hedgehog. Pressing, mounting, and naming leaves of the trees.

Game.—The children act a shipwreck, and the lifeboat going to rescue the crew.

8. *Story.*—Hiawatha's fishing for the great sturgeon, and how old Nokomis used it to supply their wants through the winter.

General Information.—Lessons on river fish and fishing; seagulls; means of lighting, past and present.

Drawing.—Any fish, a lamp.

Brush Work.—Fish.

Modelling.—A lamp, such as Nokomis might use; candle.

Singing.—"Rippling, purling little river."

Game.—Catching fish with a magnet.

9. *Story.*—The story of Hiawatha's conquest of Pearl-Feather the magician, with the help of Mama the woodpecker, and how he shared his spoils with the people.

General Information.—Lessons on snakes and on the woodpecker.

Brush Work.—Bird's nest.

Modelling.—Bird's nest and eggs.

10. *Story.*—The second visit of Hiawatha to the old arrow-maker, and his return with Minnehaha, thus uniting the tribes more closely; the subsequent wedding feast and entertainment, with story of Iagoo.

General Information.—Lessons on the deer; weaving baskets and mats; the potter and his work; lessons on birds—the jay, magpie, thrush, blackbird—and on beetles.

Drawing.—A birdcage, cup, teapot, etc.

Brush Work.—Beetles, willows.

Modelling.—Cups, plates, etc.

Mat Weaving, Basket Weaving.

Game.—Dancing and games to represent the wedding entertainment; story-telling by the children.

11. *Story.*—The story of Minnehaha blessing the cornfields, and of Hiawatha's snares to catch the ravens, and of the subsequent reaping (the growth of agriculture).

General Information.—Sugar and the sugar-cane; worms; dragon-fly; grasshopper; caterpillar; crow and raven, the enemies and thieves of the corn; reaping and carrying; the mill and miller; bread, etc.

Drawing.—Sugar-cane, caterpillar, crow.

Brush Work.—Sugar-cane, dragon-fly, etc.

Modelling.—Maize, using green paper for leaves; scarecrow.

Game.—"We are the reapers we."

12. *Story.*—The story of the way in which Hiawatha commemorated events and communicated thought by means of his picture writing, which was an advance upon the story-telling of Iagoo.

General Information.—Lessons on the various ways of communicating thought from the story-telling of Iagoo to printing, telegrams, penny post, telephone, etc.

Drawing and Brush Work.—Signs and pictures to illustrate a series of events suggested by the children.

Free Drawing.—The children to "draw" any part of the story of Hiawatha themselves.

Game.—Some children to pretend they are gypsies, and to leave things and make signs to be read and interpreted by other children following them later.

13. *Story.*—The story of the long hard winter and consequent famine, with the illness and death of Minnehaha.

14. *Story.*—The story of the White Man's Foot, which is a story of the seasons.

15. *Story.*—The story of the Passing of Hiawatha, the great teacher and leader of the Red Indians.

General Information for Stories 13, 14, and 15.—Lessons on the nations of the world, with the chief characteristics and habits of each, and their dependence on climate for food and occupation; the interchange of produce; the seasons, etc.

Drawing and Brush Work.—Flags, or anything representing the nation talked about in the general information lessons.

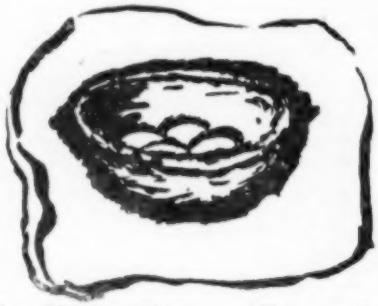
N.B.—Reading and *writing* were taken in connection with the stories and general information lessons throughout the course. *Oral composition* lessons upon pictures illustrating the subjects under discussion were taken from time to time. *Free drawings* of the stories by the children were done occasionally, when they were required to explain their own drawings. This free drawing was a favourite occupation with the class, and proved a splendid means of testing the success of the lessons.

The first essential for success in a series of lessons on any poem is that the teacher should herself make a thorough study of it and enter into its spirit. Many poems will lend themselves to this treatment—for example, *The Pied Piper of Hamelin*, *Wreck of the Hesperus*.

SUGGESTIONS FOR CARRYING OUT THE OCCUPATIONS IN CONNECTION WITH THE CORRELATED SCHEME OF WORK FOR AN INFANTS' SCHOOL.

January, Week II.

Clay Modelling.—It may perhaps be considered that the modelling of a nest is too easy an exercise at this stage. Had the idea in this scheme been simply *progression* only, then it would not have been placed where it is. In a correlated scheme the *first* thought is not what is next in order of difficulty, so much as how shall I best use motor activity to secure the assimilation of ideas



Week II.—Clay Modelling: Nest and Eggs.

first presented orally? Thus the child learns of the habits of the bird, and his hands are employed to imitate its action in constructing the nest. Children whose hands have modelled the nest will be more sure to know its shape than those who have merely had the object described to them. To model the nest, take a piece of clay and roll it into a ball. With the two thumbs press a hole, turning the ball round and round while pressing inwards. Be careful that it does not spread too much at the top. When sufficiently deep, take a pointed slate pencil and roughen the outside well, to give the appearance of twigs. If this is modelled in the spring time, roll some small pieces of clay egg-shaped and place inside.

N.B.—Be definite, and model a particular nest, the robin's in this case.

Brush Painting.—This will be painted entirely by brush strokes. Use Vandyke brown. Begin to paint from the lower part of the branch, drawing the brush towards the right. Make another stroke for the left-

Week II.—Brush Painting: Branch of Tree.

hand side, and then add the additional twigs. If the paint is used rather thin at first, and allowed to dry thoroughly, some parts of the branches may be rewashed, which will make them appear darker, and give a more finished look. (See illustration.)

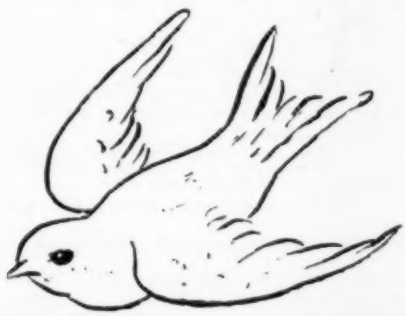
Week II.—Crayon Work: Robin in Snow.

Crayon Colouring.—This makes a most effective illustration. Reproduce by means of the copier, and give a copy to each child. Brown, red, and white crayons will be required. The bird must be coloured brown, excepting the breast. Indicate by a line in the drawing how far the red must come. Take care that the feet and legs are carefully done. Between the legs and underneath the bird fill in with white. This looks well

Week II.—Paper Cutting: Robin.

done on rather light-coloured brown paper. A touch of green may be introduced into the plumage of the bird in this case, which will have the effect of showing it up better.

Paper Cutting.—This should be drawn first, and then



Week II.—Blackboard Drawing: Robin Flying.

cut out and pasted on a card or piece of white paper. If the drawing of it is quite beyond your children, re-

produce it by means of the copier. Let the children colour it with crayons, and then cut out. Notice specially in the robin the drooping of the point of the wing and the very erect tail.

Blackboard Drawing.—The illustration here given is a useful one, but rather difficult. Show the children a finished drawing first, and then draw it again bit by bit with them, beginning at the beak.

Stick Laying.—This would be simply a repetition of a previous week. Have it done from memory.

January, Week III.

Clay Modelling.—There is not much explanation needed for this. The main point is to get the proportions and the rounded shape of the shovel. Model one previous to the lesson, so that the children may see it finished, and then model one with them again.

Brush Painting.—This is a very effective exercise.

WEEK III.—BRUSH PAINTING: HOUSE WITH SNOW.

Use sepia on white paper. Let the children first draw the house with faint pencil lines on a rather larger scale. Wash over the gable side, leaving a very thin streak of white along the right angle; then paint the front, leaving white spaces for the windows and porch over the door. It would be wise to let the children indicate these spaces with fine pencil lines. Outline the roof and paint the chimney. Make fine lines across the windows for the woodwork. See that the outline in front is not a perfectly straight line, to give the idea of the snow drifting up against the side of the house.

Crayon Work.—Two lessons have been allowed for

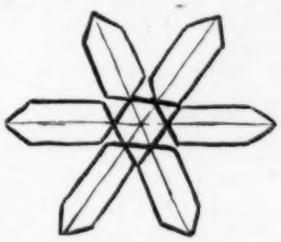
WEEK III.—CLAY MODELLING: SNOW SHOVEL.

WEEK III.—BLACKBOARD DRAWING: SNOW MAN.

the same picture, to ensure its being satisfactorily finished, so nothing further need be said here.

Paper Cutting.—An exercise in cutting the hexagonal form has been taken for this lesson, as being applicable to the snowflake. Give the children a four-inch square of paper. Explain what is going to be done. Let them first fold and cut the paper into four squares; from each of these squares cut an irregular hexagon as follows:—Mark the diagonals on the squares by folding the two opposite pairs of corners upon each other, then fold two opposite corners to the centre. The result is an irregular hexagon. The two folded triangles may then be cut off, and the four forms placed so as to make a star something similar to the illustration. If time allows, more hexagons may be cut, and the star made to conform to the one given, with a regular hexagon cut from the equilateral triangle in the centre.

Blackboard Drawing.—This generally affords great amusement to children, and it is often very well executed. To have it drawn on brown paper with white chalk is the best plan, or a good bold drawing on the blackboard does well.



WEEK III.—PAPER CUTTING: SNOWFLAKES.

WEEK III.—STICK LAYING: SIMPLE STARS LIKE FLAKES.

Stick Laying.—In the illustration given six long and twelve short sticks are used. The skeleton six-sided star with the six long sticks is sufficient for quite young children to attempt.

January, Week IV.

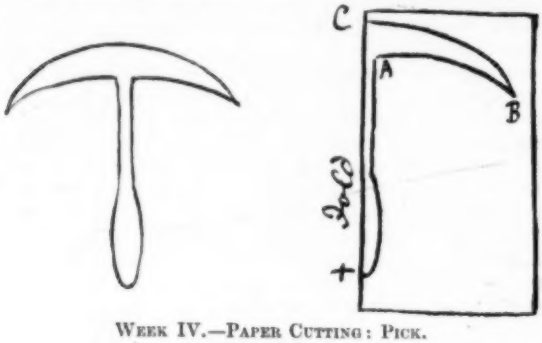
Clay Modelling.—Children who have modelled the flower-pot should not find this too difficult. The only very decided difference is the shape at the top, formed by drawing out one side rather more than the other. The handle at the top and the little one at the back are characteristics which should not be omitted.

WEEK IV.—CLAY MODELLING: COAL BUCKET.

Brush Painting.—There are many objects in connection with a lesson on the miner which would be suitable for an exercise either in brush painting or in colour washing, so this is merely a suggestion. A delicate little piece of work is required so that a streak of white is left where the handle joins the shovel.

Paper Cutting.—Take a square of paper and fold it in half. Begin to cut at +, forming a very slight curve

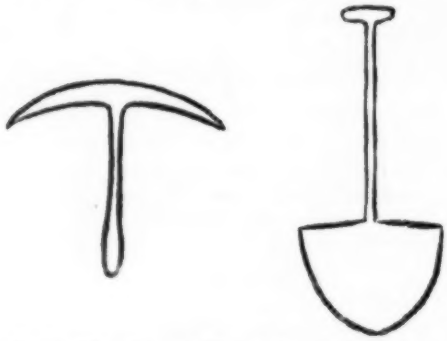
for the handle of the pick; then cut straight up to A; turn at right angles, and curve rather downwards to B. Make a sharp point here, and turn upwards, forming a



WEEK IV.—PAPER CUTTING: PICK.

curve to C, and cut right off. Open out. Make a diagram on the blackboard, and if demonstrating, stand so that the children see you cutting exactly as they will have to do it.

Crayon Work.—This does not call for much remark.



WEEK IV.—CRAYON WORK: PICK AND SHOVEL.

Reproduce by means of the copier. Give a copy to each child, and let them fill in. Demonstrate the whole process on the blackboard. Use brown crayon.

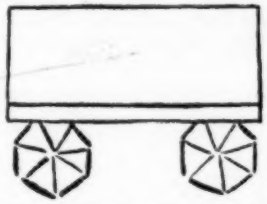
Blackboard Drawing.—This ought to be an interesting object for the children to draw. It should, of course, be

WEEK IV.—BLACKBOARD DRAWING: MINER'S LAMP.

WEEK IV.—BRUSH PAINTING: SHOVEL.

explained to them that part of this lamp is wire gauze instead of glass. The simple experiment of placing a piece of wire gauze over a gas jet might explain to them the principle of the Davy lamp.

Stick Laying.—Two long sticks and two short ones are required to form the body of the truck. The wheels seem rather a problem, unless you have any rings in



WEEK IV.—STICK LAYING: COAL TRUCK.

school. If not, the teacher can go round and add them in chalk, or give short sticks and have them formed as represented in the illustration.

MY NURSERY FRIENDS.

[This piece is suitable for a recitation at a school entertainment. The reciter should be seated in a chair near the front of the platform, and as the characters are mentioned they should enter and bow. When all the nursery characters are on the platform, they might perform a dance, which could take place between the seventh and eighth verses. As indicated in the last verse, the characters should disappear at the sound of a bell.]

WHILE I was sitting in my house,
As quiet as a sleeping mouse,
I heard a knocking at the door,
And in came visitors—a score.

I knew them all, old friends they were.
They clambered up my wooden stair;
I knew them when I was a boy,
And, oh! to see them gave me joy.

First came Jack Horner, who sat in a corner,
With little Boy Blue, who blew on his horn;
Then Margery Daw, who slept upon straw,
And Peter who picked a peppercorn.

Next Jack and Jill, who fell down the hill,
Their noses were covered with plaster;
And little Miss Muffet, who sat on a tuffet,
And Jenny who found a new master.

Then little Tom Tucker, who sang for his supper,
Escorted Mary, who carried her lamb;
And the Queen of Hearts brought a basket of tarts
All nicely filled with strawberry jam.

Next came Humpty-Dumpty, who fell off a wall,
And Georgie Porgie, pudding and pie;
While Simple Simon, without the pieman,
Led in Bo-Peep with a tear in her eye.

But old King Cole, that merry old soul,
Soon called for Tom the Piper's son;
And he and Jack Sprat, who could eat no fat,
Made us laugh till we cried with their antics and fun.

But just as all was going well,
I heard the tinkle of a bell.
Off ran my guests; I gave a scream,
And then I woke—it was a dream.

EDWARD SHIRLEY.

OUR TUTORIAL SECTION

OUR PUPIL TEACHERS' AND SCHOLARSHIP COURSE.

BY ARTHUR T. FLUX,

Late Principal of the Belvedere Pupil Teacher Centre, First on Scholarship List; Author of "Scholarship School Management," "Building of the British Empire," etc.

NEW SCHOLARSHIP COURSE FOR DECEMBER 1905.

First Month—January.

IN commencing a new year's work for the Scholarship Examination, a few words are necessary as to the scope and objects of this course. While there are many candidates who have the advantage of excellent teaching at various centres, there are nevertheless many pupil teachers working in isolation who are continually meeting with difficulties in their work which seriously hinder their rapid progress. To them primarily we offer any assistance they require, if they will only take the trouble to write for it. In these columns the whole of the syllabus is divided into monthly portions, allowing adequate time for revision. Attention is directed to the points which require special study. Notes are given where necessary to supplement the ordinary text-book, and monthly test papers are set, which are prepared from the recent government examinations. The answering of these test papers is a very important part of the preparation, as upon the facility, rapidity, and accuracy with which a student answers questions on paper depends his ultimate success. Arrangements can be made by which the monthly papers can be marked and returned for a nominal sum; but whether this is done or not, any student following this course has a right to submit for correction and advice any specimen of work—essays, penmanship, drawings, etc.—with regard to which he feels doubtful, or to ask for any notes, etc., which may be necessary to elucidate or amplify his home reading.

Method of Study.—Some advice is absolutely essential to students who are working largely by themselves. In the first place, the examination is not one of any difficulty to a candidate with the average intelligence. A year's preparation, following the ordinary study as a pupil teacher, is ample time to ensure a good position on the list. The majority of the failures which occur annually are due not so much to a lack of brains as to a lack of method in study; and we can guarantee that no one who follows this course, does the work prescribed, and answers the test questions, will be anywhere near a failure in the examination.

1. The preparation must be regular. Periods of intense cram, followed by fits of laziness, are fatal. Each week's work must be done in that week, and done well.

2. Study must be systematic. Every student must draw up a time-table, so arranged as to divide the time at disposal for study between the subjects in proportion to their value or the lack of knowledge of them. The time-table may need a few modifications during the first few weeks; but when it has been definitely settled, it must be rigidly adhered to. It is impossible to suggest a time-table that would suit every one, but I shall be pleased to look through any submitted to me, and suggest alterations that appear necessary.

3. Good text-books are essential, and it is better to know a small book thoroughly than a large one hazily. Nothing is so fatal to success as mistiness of thought. What is learnt must be learnt definitely.

4. Notebooks must be kept, into which digests and summaries may be entered. Mere transcription from a text-book is largely waste of time.

Further hints are given under the various subjects.

THE SYLLABUS AND TEXT-BOOKS.

Detailed syllabuses may be obtained post free from The Secretary, Board of Education, Whitehall, London. Quotations are given below.

1. *Reading.*—"To read with clear enunciation, ease, and intelligence from a work of a standard prose author or of a standard poet."

This subject requires as much care as the others. Failure in this subject entails failure in the whole examination; and although most candidates can say the consecutive words, there are remarkably few good readers. The reason is obvious—the subject is neglected. What reading *is* done is done silently, and the muscles of the tongue and throat do not acquire that rapid sympathy with the eye upon which good delivery depends. There must be regular oral practice before a good critic. In addition to this, the student must read widely and wisely. Any good standard book, any biographies, tales of exploration and discovery, description of life and manners in other lands, will assist in forming the well stored and balanced mind which every one should possess, and will in addition counteract the narrowness and dullness of view produced by poring over text-books. Neglect of general reading is fatal to development. Novels trashy and sensational, and erotic magazine articles, are to be avoided.

2. *Recitation.*—One hundred lines. The same remarks apply to this as to oral reading. Practice is necessary. Correct verbal repetition is useless.

Suitable passages for repetition from *Henry the Fifth*:—

Act i., scene 2. "My learned lord, we pray you to proceed," to "All out of work and cold for action."

Act iii., scene 1. "Once more unto the breach," to "Cry, 'God for Harry, England, and Saint George.'"

Act iv., scene 1. The soliloquy—"Upon the king," etc., to "Whose hours the peasant best advantages."

Act iv., scene 3. "Oh that we now had here," to "Shall yield them little, tell the constable."

3. *Teaching.*—No separate paper is set in this subject, but questions on methods of teaching are included in the other papers.

The text-book used will be *Scholarship School Management* (Nelson and Sons).

4. *Drawing.*—Freehand drawing in outline (see full syllabus).

All candidates are strongly urged to use a brush for their drawing. A medium sable and sepia is much better than pencil or pen. Regular practice from copies and from nature is, of course, necessary. Nearly all school publishers issue suitable copies at a low price. In the execution of the drawing care must be taken in the early stage to get due proportion. The main lines must be sketched in first; the details will then fall naturally into place.

5. *Music* in both notations.

Nelson's *Music for Pupil Teachers* takes all the theory in both notations necessary. Practice should be taken in the practical part. Curwen's *Practical Music for Pupil Teachers* will afford abundant exercise.

6. *Penmanship.*—This is a notoriously weak subject, because it is despised, and no care is taken to form a good style of writing. The *Practical Teacher Copy Book*, specially drawn up for this examination, will afford plenty of practice in a good style. Care must be taken at all times, and good pens, ink, and paper are necessary. The student should always keep to the same kind of pen—a medium point, such as Brandauer's Review, is the best to use.

7. *Dictation.*—Steady preparation in spelling is necessary, unless the subject is very strong. *Words Commonly Misspelt*, Series A, B, C, and D, 1d. each, will be found very useful, and few difficult words will be met which are not therein contained.

8. *Composition.*—As the examination is a written one, this subject is of the highest importance. There is no royal and easy road to success. A good essay can only be written by those who have (*a*) a good fund of general knowledge, which arises from wide and thoughtful reading; and (*b*) a good style, which comes of long practice and continual care. Books on composition may point out the correct way, but they cannot help the student in the least if he does not follow the advice given. Essay writing is a severe test of capabilities, and unless the subject receives adequate attention weekly, the essay in the examination will be marked low. Two little books which may be of service are Meiklejohn's *One Hundred Essays in Outline*, and Maxwell's *Composition for Schools and Colleges*, both pub-

lished by Meiklejohn and Holden. These books show the student how various subjects are best treated, and also supply him with ideas on ordinary topics.

9. *English.*—The parsing and analysis will be set from unseen passages. Sufficient examples will be furnished in the course.

For ordinary grammar, any recognised text-book may be used—Nesfield's, Meiklejohn's, Daniel's, Smith's, etc. For the etymology and general outline of the history of the language, the *Pupil Teacher's English Notebook* (Nelson's) will be adequate.

Candidates are advised to prepare *Henry the Fifth* in preference to *Much Ado about Nothing*. There are many editions which are excellently prepared—Macmillan's, Arnold's, Allman's, Blackwood's, Meiklejohn's (The Blackfriars Shakespeare). We shall use the last for reference in these columns.

Special editions of Bacon's *Essays* are also published by several firms. The one issued by Bell and Co. may be safely recommended.

For the general reading books—*David Copperfield*, *Lay of the Last Minstrel*, *The Talisman*—the student has a wide choice of good editions.

10. *Geography.*—Any of the recognised text-books will do for the world generally, and the colonies in detail. Gill's *Colonies* is a wonderfully cheap book, though too full. Holden's *British Colonies* is an excellent synopsis to use, and contains nothing which the student should not know. Regular practice must be taken in drawing sketch-maps.

11. *History.*—The syllabus is altered this year. "Outlines of English history from the Roman invasion to 1603, and detailed study of English history from 1487 to 1558." The ordinary text-book will do for the former. Notice will be given next month of specially-prepared books for the latter. The special period will be treated fully in the course.

12. *Arithmetic.*—This is simplified somewhat. Questions will not require a knowledge of cube root, scales of notation, foreign exchanges, true discount, troy weight, apothecaries' weight, and brokerage in stocks.

Text-book.—Christian and Collar's *New Arithmetic* is by far the best book for teachers.

13. *Algebra.*—The amount required has been unfortunately curtailed, and the student is not expected to go beyond simultaneous equations of two unknowns.

Text-book.—Hall and Knight (Macmillan).

14. *Geometry.*—Either Euclid, Books I. and II., or syllabus in Practical and Theoretical Geometry.

Students will probably find the Euclid the safer paper to take.

15. *Geometry and Algebra for Women who do not take a paper in Languages.*—For those who have no chance of learning French this is a valuable concession. Easy algebra, and either Book I. in Euclid or a course of geometry, is well within the power of any student. An excellent book has been issued by W. B. Clive and Co., covering the course concisely.

16. *Languages.*—*Quintus Curtius*, Book IX., chap. vi. to end, is set for Latin. No special book for French. Any individual assistance desired will be given, but it is comparatively useless to attempt to teach a language through these columns.

17. *Elementary Science.*—This is practically the same as last year. All students must take Section I., which is a revision of what they have done as pupil teachers, and one of the following (*a*) elementary chemistry, (*b*) elementary astronomy, (*c*) elementary biology. Of these probably the chemistry will be the easiest. Longman's *Physiography*, Sections I. and II., is a reliable book.

"General information" is omitted from the syllabus.

In addition to the text-books mentioned above, a good atlas and a good etymological dictionary (Chambers's or Skeat's) are also required. One of the many year-books published will afford much useful information. Whitaker's *Almanack* is perhaps the best. Knowledge of current events may be derived from the columns of a good newspaper.

Work to be Prepared.

1. *Reading and Repetition.*—Ten minutes' oral practice per day. Learn twenty lines of the repetition.

2. *Teaching.*—Chap. i., *Scholarship School Management.*

This chapter deals with the elements of psychology, without some knowledge of which it is impossible to become a successful teacher. It should be very carefully studied, and though perhaps it may appear dry, it is of vital importance. Unless the student knows a little of the laws which govern the workings of the mind, it is as impossible to deal successfully with the mind as it would be for a doctor to heal diseases who had no idea of physiology.

3. *Drawing.*—One or two freehand copies should be drawn each week, and submitted for criticism.

4. *Music.*—Staff notation. The major and minor scales and signatures. The mnemonic GooD AlE and BeeF gives the sharp scales in their order, reading the initial and final letters forward, G, D, A, E, B, F; and the flat scales, reading backward, F, B, E, A, D, G. The minor scale always takes the signature of the relative major scale, which is a minor third above it.

5. *Penmanship.*—Write a page daily in the *Practical Teacher Copy Book*, and take great care at all times.

6. *Composition.*—Write one or two essays each week on such subjects as:—

(*a*) A museum.
(*b*) Friends and friendship.
(*c*) Work and its rewards.
(*d*) Westminster Abbey.
(*e*) True courage.
(*f*) The value of knowledge.
(*g*) The study of natural history.
(*h*) Rain and its uses.

Read up the subject if necessary. Prepare an analysis of your essay, arranging the headings in proper order. This will keep you from wandering and useless reiteration. The essay should be written out roughly, and then criticised carefully sentence by sentence, altering and polishing till it is your best. Reading aloud will often detect errors or awkward sentences which escape the eye. Send in one essay for criticism, with the analysis on which it is written.

7. *English.*—

(1.) Learn the Anglo-Saxon prefixes.

(2.) Learn fifteen roots and meanings per week.

(3.) Prepare the history of the language up to 1066.

(4.) *Henry the Fifth.* Read through the play, and get a general idea of the plot and the *dramatis personæ*. Study in detail prologue and Act i., scene 1.

(5.) Prepare thoroughly the essay "Of Truth."

Notes.—The derivation must be steadily and consistently carried out.

(1.) In the history of the language the chief points before 1066 to be noted are:—

(*a*) The Latin element left by the Roman invasion (nine or ten words).

(*b*) The Celtic element, in geographical names and a few common articles.

(*c*) The Danish element, common in the north-eastern counties, where the Danes settled.

(*d*) The chief characteristics of the Anglo-Saxon tongue—its many inflections, its power of compound words, etc.

(2.) Before commencing a detailed study of the play, the student *must* get a general idea of the whole, and of the period to which it refers. An account of Henry the Fifth's reign should be read, and especially of his campaign in France. A very good analysis and historical sketch is given in the edition recommended.

(3.) Each essay must be, in Bacon's own words, "chewed" and "digested." Prepare an analysis of the subject; do not depend upon the one given in the text-book. It may be better than your own, but you must acquire the mental habit of digesting a paragraph into a few words. The application necessary to form a good analysis of one of these essays is invaluable in training to correct and accurate thought.

8. *Geography.*—(*a*) Revise the general geography of Europe, and France, Spain, and Portugal in detail. (*b*) Learn thoroughly the geography of the British possessions in Europe and Asia (excluding India).

Draw maps for everything. Repeat till known. When you can draw a fairly accurate map, you know a country, and not before. The industries, productions, imports and exports, chief towns, and details of the government must receive special attention.

9. *History.*—Prepare the history of the Roman occupation.

Chief points:—Cæsar's invasions—why he came. The Britons and Druidism. Roman conquest—reason and methods. Roman towns (four classes). Roman roads and wall (illustrated by a map). Causes of leaving. Traces of Roman occupation. Effects of occupation on people and country.

10. *Arithmetic.*—Revise the theory of vulgar fractions, and look through the examples given in the text-book, working any that appear to present difficulty. Work the test paper given below.

11. *Algebra* (*men*).—Factors of expressions in the form of $a^2 - b^2$, $a^3 - b^3$, $a^3 \pm 2ab + b^2$, $a^4 + a^2b^2 + b^4$.

(*Women*).—Algebraic notation. Work exercise 1*a* in Scholarship Mathematics.

12. *Euclid* (*men*).—Definitions, axioms and postulates, and Props. 1–6. With two deductions each week.

(*Women*).—Definitions, axioms, and postulates.

13. *Science.*—Revise Section I. Matter, force, motion, and inertia.

In preparing this elementary science, the student should make it as practical as possible. The statements made must be checked and proved by actual experiment. As a note to the subject says, "The syllabus has been so arranged that the necessary experiments can be conducted without any expensive apparatus," and any student with a little care and ingenuity can make nearly all that is needed. A few shillings should cover the entire cost. Actual experiments in determining specific gravity, centre of gravity, parallelogram of forces, etc., are worth much more than mere reading. If possible, a set of metric weights should be obtained, as all questions are given in grammes, etc. Should any difficulty be experienced, write at once for assistance.

Test Paper.

1. Write an essay on Holidays and their proper use.
(Time, about forty minutes; length, 50 to 60 lines. Define the term, and explain the etymology. Point out their necessity to all workers, and discuss the different ways in which they should be spent according to the different occupations followed.)

2. Analyse the following, and parse the words in italics:—
"By labour and intent study, *which* I take *to be* my portion in this life, joined with the strong propense of nature, I might perhaps *leave something* so written to aftertimes *as* they should not willingly *let die*."

3. Point out how the physical geography of a country affects its political and social life.

4. Say what you can of the social life and religion of the Britons when Cæsar first visited England.

5. Work the following:—
(1.) Which is the number nearest to 3,606,236 that is divisible by 357? Ans. 3,606,414.

(2.) Resolve 2145, 1170, 1287 into their prime factors, and find the value of $\left(\frac{32}{1287} + \frac{37}{2145} - \frac{47}{1170}\right) \times 514\frac{1}{2}$.
Ans. 3, 5, 11, 13; 2, 3, 3, 5, 13; 3, 3, 11, 13; 1.

(3.) If a beam, 16 feet long, $2\frac{1}{2}$ feet broad, and 8 inches thick, weighs 1280 pounds, what must be the length of a beam of the same material, whose breadth is $3\frac{1}{4}$ feet, thickness $6\frac{1}{2}$ inches, and weight 2028 pounds? Ans. 24 feet.

(4.) If a man can row 3 miles an hour against a stream, the rate of which is $2\frac{1}{2}$ miles per hour, how far will he row in $3\frac{1}{2}$ hours with the stream? Ans. 28 miles.

(5.) What is the value of $3714\frac{3}{14}$ yards of cloth at 16s. $7\frac{1}{2}$d. per yard? Ans. £3091, 8s. $6\frac{1}{2}\frac{1}{2}$d.

6. Explain how the centre of gravity may be found experimentally and geometrically. Where is the centre of gravity in an iron ring, in a skeleton cube, in an equilateral triangle?

PUPIL TEACHERS' COURSE.

For Entrance Examination, 1905.

1. *Reading and Repetition.*—Regular oral practice is necessary in both these subjects.

2. *Penmanship.*—Write a page daily in the *Practical Teacher Copy Book.*

3. *English.*—(1.) *Lay of the Last Minstrel*, canto iii., stanza 25 to the end. Be prepared to paraphrase and analyse any part, and to parse any word.
(2.) Learn ten roots and meanings per week.
(3.) Learn the Latin suffixes, with their function and use.
(4.) Write an essay each week. Subjects:—
(*a*) Newspapers—what they are, their use and abuse.
(*b*) Advertisements.
(*c*) A winter day. (Describe as graphically as you can the appearance of nature.)
(*d*) Describe any place of historical interest you have visited.
(*e*) Write a letter describing the chief industry of your native place
Think over the subject before commencing to write. Arrange your ideas in proper order—that is, sketch out an analysis of it.

4. *Geography.*—Prepare thoroughly the geography of Russia, Austria, and the Balkan Peninsula. Sketch-maps must be freely used to fix the names and positions of places. The productions, imports, exports, chief towns, and government are very important. In preparing the Balkan Peninsula, be most careful to note the constitution of each state. Note also that the whole peninsula was formerly under the power of the Turks. Greece became independent in 1830. Most of the other states obtained their independence by the Berlin Treaty of 1878.

5. *History.*—Henry the Sixth to Richard the Third.
Chief points:—The loss of the French provinces, due partly to the enthusiasm raised by Joan of Arc, but mainly to the loss of the Burgundian alliance. Burgundy, a tributary province of France, was nearly as powerful, and had joined England, owing to the murder of the Duke of Burgundy by the French Dauphin. Afterwards a quarrel arose between them, and when this help was withdrawn, the English lost rapidly.
The War of the Roses. Prepare and commit to memory a genealogical table showing the exact relationship of the rival claimants. Note the immediate cause of hostilities. The Duke of York had anticipated becoming king on Henry's death. The birth of a son and heir to the king led him to put forward the claim that he had a better right than Henry himself. Make out a list of the battles, the leaders, and results, and fix the places in a sketch-map of England.
Note that the war was between the nobles and their retainers—the towns and merchants were but little affected—and that it was carried on with such hatred and ferocity that it practically destroyed the feudal system. Learn a life of the "kingmaker," and note why he changed sides in the contest.

6. *Arithmetic.*—Proportional parts, partnership, averages, and percentages. Study carefully the explanations given in the text-book, and work a sufficient number of examples to be sure that you understand the methods.
Work the following test paper:—
(1.) What is your method of dividing one decimal by another? Take as an example 8·046 divided by 14·9.
Simplify $\frac{\cdot285 \times \cdot002 \times 1\cdot8}{\cdot009 \times \cdot038}$.
(2.) Reduce £·64375 + ·025 of £1, 5s. to the decimal of ·675 of £2.
N.B.—There is no necessity to find the money value. Turn each into the decimal of £1.
(3.) After paying 7d. in the pound income tax, a person has £625, 18s. $10\frac{3}{4}$d. What was his gross income?
State thus—
19s. 5d. is the remainder of a gross income of £1,
1d. " " " " $\frac{1}{19\text{s. }5\text{d.}}$,
£625, 18s. $10\frac{3}{4}$d. " " " " $\frac{\text{£625, 18s. } 10\frac{3}{4}\text{d.}}{19\text{s. }5\text{d.}}$.
(4.) Find the value of (·8$\dot{2}$ of 13·4 + ·13$\dot{5}$) of £1, 4s., and express the result as the decimal of £13.
(5.) Equal quantities of tea which cost 2s. and 1s. 8d. per lb. respectively are mixed and sold for 2s. 2d. per lb. at a total profit of £3. How many lbs. were sold?
Ans. (1.) 3; (2.) ·5; (3.) £644, 15s.; (4.) 14s. 5$\frac{1}{2}$d.; ·0$\dot{5}$; (5.) 180 lbs.

7. *Algebra.*—Notation, the use of brackets, and substitution of numerical values.

8. *Science.*—The balancing of different liquids in tubes. Formation and reading of a simple barometer. Physical effects of heat on different substances.

Test Questions.

1. Give in your own words the meaning of the following passage:—

"Serene will be our days and bright
And happy will our nature be
When love is an unerring light
And joy its own security
And they a blissful course may hold
Live in the spirit of this creed
Yet seek thy firm support, according to their need."

2. Analyse the passage above, and parse the words *when, own, may hold, live, yet, according to.*

3. Describe with a sketch-map, a journey from Christiania to Hammerfest.

4. Where are the following places, and for what are they noted—The Hague, Leyden, Bruges, Namur, Trondhjem, Gothenburg, Elsinore?

5. Say what you can of the Lollards under these heads—(*a*) their religious beliefs, (*b*) their social ideas, (*c*) their persecution.

6. Describe Henry the Fifth's campaign in France, and give a detailed account of the battle of Agincourt, with a plan.

7. Write a short essay (25 to 30 lines) on Books.

8. (*a*) Name the following intervals—**se** to **doh**^{1}; **de** to **ta**; **fah** to **re**^{1}; **se**$_1$ to **fah**.
(*b*) Which of the following is highest, and which the lowest in pitch:—
te Key G, **fah** Key B♭, **ray**^{1} Key D, **soh**$_1$ Key C, **ray**$_1$ Key A♭?

(*c*) Write out the following passage in four-pulse measure. The figures show duration in pulses or fractions of a pulse:—

$\frac{3}{4}$	$\frac{1}{4}$	$\frac{1}{2}$		$\frac{1}{2}$	$1\frac{1}{2}$	$\frac{1}{2}$		$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{2}$	2	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{3}{4}$	$\frac{1}{4}$	1
s	**f**	**m**	rest	**f**	rest	**m**	**m**	**r**	**d**	**m**	**s**	rest	**f**	**m**	**r**	**d**	**r**	**d**	**d**		

OUR CERTIFICATE COURSE FOR 1905.

BY GEORGE COLLAR, B.A., B.SC.,
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TEST QUESTIONS ON LAST MONTH'S WORK.

Theory of Teaching.

1. In what way can the teaching of history and the teaching of geography be made to help each other? (Cert.)
2. How can history be employed in the elementary school to improve the memory of the children without resorting to "cramming"?
3. Write notes of a lesson on one of the following:—
   (*a*) The feudal system.
   (*b*) The reign of King John.
   (*c*) The life of the Duke of Wellington.

English Language and Literature.

1. Who were the "Cavalier poets"? Say what you know of their work.
2. Give a sketch of the fifth act of *Richard the Second*, and mention any historical inaccuracies in the play that Shakespeare has introduced for dramatic effect.
3. Write short comments on the following lines:—

   "To Julius Cæsar's ill-erected tower."

   "Our holy lives must win a new world's crown,
   Which our profane hours here have stricken down."

   "Sent back like Hallowmas."

   "Choose out some secret place, some reverend room."

History.

1. Give an outline of the Thirty Years' War, and say in what way England was interested in it.
2. Trace the relations between England and Scotland from 1603 to 1660.

Geography.

1. Give an account of the monsoons.
2. Write a short account of the railways of India.
3. Contrast the valley of the Indus with that of the Ganges.

Arithmetic.

1. In a race of 100 yards A can beat B by 5 yards, B can beat C by 5 yards, and C can beat D by 5 yards. How should they be handicapped for a 100 yards race, putting A scratch, and giving him the advantage of any odd fraction of a foot?
2. A, B, and C buy a bicycle costing £10 between them, and agree to pay in proportion to their ages, which are 12 years, 15 years, and 18 years respectively. At present A has only £2, 10s. 10d., B £3, 12s. 2d., and C finds the remainder. What future payments must they make between themselves if the agreement is to be carried out?

Geometry.

1. Two circles intersect at A and B. Show that of all the lines passing through A and terminated by the circumferences, the greatest is that which is parallel to the straight line joining the centres of the two circles.
2. If two circles do not touch one another, show that the shortest straight line which can be drawn from a point on the circumference of one to a point on the circumference of the other is that which when produced passes through the centres of both.

Algebra.

1. Solve the equations:—

   (i) $\dfrac{21x^2 - 17x + 37}{28x^2 - 27x + 58} = \dfrac{3}{4}$.

   (ii) $(12x - 14)^2 + (5x - 11)^2 = (13x - 17)^2$.

   (iii) $\dfrac{7x^6 - 5x^5}{4} - 27x^5 = \dfrac{10x^7 - 13x^6}{3x} - 5x^6$.

2. Multiply $\dfrac{4a}{3x} + \dfrac{a}{2y} - \dfrac{4b}{3x} - \dfrac{b}{2y}$ by $\dfrac{4a}{3x} - \dfrac{a}{2y} + \dfrac{4b}{3x} - \dfrac{b}{2y}$.

3. Simplify $\dfrac{x^3 - 2x + 2}{x^3 - 3x + 2} - \dfrac{x^3 + 2x - 2}{x^3 + x - 2}$.

Elementary Science.

1. Describe the chief tissues present in a bracken fern.
2. Describe the process of reproduction in a fern.

NOTES AND SYLLABUS FOR JANUARY.

English Composition.

Study carefully Nesfield's *English Composition*, chaps. viii. and ix. A sentence or passage must not only be grammatically correct, it should aim at being elegant and graceful as well. If these chapters are carefully studied, the student will find much to guide him. Some of the works of our great prose writers should be read in order to note the points in which their superiority in style is shown. Those who are working from Meiklejohn's *Art of Writing English* should study chaps. xi., xii., and xiii. The chapter on essay writing is important, as the essay is the form which the composition test takes at the Certificate Examination. The chapter on précis writing is perhaps even more important, because it is a subject which is very much neglected, and yet which is so extremely helpful to the student in preparing his own work. Very few students seem to have any idea of making a précis or summary of a chapter of history or other work; but yet it is a most valuable method of fixing the salient points in the mind, and also saves a great deal of time in the work of revision.

Prepare essays on the following subjects:—

1. Parks and open spaces.
2. "Kind hearts are more than coronets,
   And simple faith than Norman blood."
3. "Take care of the pence, and the pounds will take care of themselves." Show that the last part of the proverb is not always true.

Theory of Teaching.

Study Collar and Crook's *School Management*, chap. xi. One of the most common mistakes made in teaching geography consists in allowing the children to think that the matter is far removed from their own sphere of thought. Even when the scheme of geography begins with the plan of the classroom, the children are not made to see that they are simply extending their knowledge to a larger circle, of which they form a part as truly as they do of the smaller circle. As a rule, children do not understand all that is taught by a map. The maps of the Ordnance Survey are now issued at a cheap rate for educational purposes: thus five hundred copies of the district in which the school is situated can be purchased for two pounds, or two hundred for twenty-five shillings. This district map can be made the basis of an enormous amount of geographical teaching. Two points of special interest in the upper classes are—the methods adopted for indicating the relief of the surface and projections, or the methods of representing the curved surface of the earth on a flat piece of paper. The relief may be shown by contour lines, and practice should be given in drawing sections between given points. It must be remembered that the only points given definitely in this exercise are those at which the line along which the section is made crosses the contour lines. The contour map tells nothing at all of the height of the country between two successive contour lines beyond the fact that it lies between the two limits, and that where the contour lines come close together the rise is sharp, while the rise is slow in districts in which the contour lines are far apart. The nature of the slope may be shown on a map by means of "hill-shading"—that is, an arrangement of lines running down the slope, and showing by their thickness and closeness the rapidity of the slope. In this system the top of a ridge or of a plateau is left unshaded just like a plain; but a hill-shaded map should be used by the teacher in conjunction with one showing contour lines. The relation of water-courses to slope affords a fine subject for teaching, and is a matter in which the children can check the map of their own district, and thus appreciate the real nature of other countries from the study of a map. The impossibility of representing a curved surface of any extent upon a plane surface without distortion in some part or other must be driven home in the minds of the elder children, and the faults and advantages of each system of projection can be explained.

English Language and Literature.

Read carefully the third book of the *Golden Treasury*, make a note of the more striking poems and passages, and commit to memory some of the best. This book deals with the poetry of the eighteenth century; and the general level of the work of this period was high, although there were no poets to compare with Shakespeare, Milton, or Dryden—the last of whom died May 1, 1700. The form of poetry underwent a very considerable change, although, as our collection is one of "songs and lyrics," it is not very noticeable here. The heroic couplet—or pair of lines riming together, and each containing ten syllables—came into fashion. This was partly owing to the example of Waller, who lived towards the end of the previous century, and partly owing to

the precepts of Boileau and the influence of the French poets. With the exception of lyrical poems and dramatic blank verse, nearly all the poetry of this period was written in heroic couplets. This style of poetry becomes very tedious if the reader attempts to do much at a time, and this probably accounts for the want of popularity now experienced by the works of Pope, who was unquestionably one of our greatest poets, as well as by other writings of this period. After the death of Pope the arbitrary rule of the classical school was relaxed, and a strong tendency set in towards the direct appeal to nature. The leader of this "nature" school was James Thomson, who drew his inspiration from the beautiful view from Richmond Hill. He was the writer of a few plays, which are now forgotten, and of a few patriotic songs, including *Rule, Britannia*. William Collins was a great friend and admirer of Thomson, and when the latter died Collins wrote the exquisite elegy beginning—

"In yonder grave a Druid lies."

This poem and the *Ode to Evening* and the *Ode written in 1746* are very popular, and show Collins's mastery over the delicate art of melody. In *The Passions* the student will find a splendid exercise for recitation on account of the close connection between the words and the ideas they express.

The poet who represents the lyric division of the art in the highest perfection in this period, if not in any period of English literature, is Thomas Gray; and, indeed, the compiler of the *Golden Treasury* associates this period with the name of Gray. He did much to popularise the ode, which was a form of poetry much neglected in England at that time. He was a careful student and imitator of Pindar, the chief writer of odes among the Greeks. This is referred to on his monument in Westminster Abbey, on which the epitaph closes with the statement that Britain

"Felt a Homer's fire in Milton's strains,
A Pindar's rapture in the lyre of Gray."

Gray's verses are remarkable for their finish. He used to spend much time in revising his poems, and making sure that he had selected the most appropriate word in each case. For instance, the celebrated *Elegy*, instead of being written straight off while the poet was seated on a tombstone, as some are led by the name to suppose, occupied the writer no less than seven years. He had a very delicate ear, and his literary studies made him very particular about employing each word in its fullest and most correct sense. The *Bard* and the *Progress of Poesy* are styled "Pindaric odes," because they follow a form much used by Pindar. The student will notice that there are three different types in the stanzas, and these recur. Shelley was a great admirer of Gray, and his odes show how closely he studied the works of Gray. After the death of Gray there was a dearth of poetic genius in the south of our island; but in the north Burns was writing his poems, which will always be looked upon as models of poetic expression of deep feeling. Many of the minor poems in this book are extremely beautiful; among them we may mention Lady Lindsay's *Auld Robin Gray* and Rogers's *Mine be a Cot beside the Hill*, while the *Blind Boy* will keep the name of Colley Cibber fresh when all his other voluminous writings are forgotten.

The other work that has to be studied in detail is Burke's *Thoughts on the Present Discontents*. This book is published with notes by the Clarendon Press, and also in Cassell's National Library. The latter is a very handy little edition without notes, but containing a short introduction by the late Professor Henry Morley. As it can be obtained for a few pence—and *Richard the Second* can be had in the same series—we advise the student to carry a copy about with him to read at odd moments. Read the book straight through, so as to get an idea of its general argument.

English History.

Prepare to the year 1712. Some special problems to deal with are the relations between the sovereign and the people.

How was it that Charles the Second, in spite of all his faults, managed to retain the goodwill of the people, and yet William the Third, with his many good qualities and the great benefits he secured for the country, was unable to attain popularity? After the Restoration, the supremacy of Parliament must be recognised. Charles dared not openly set himself against Parliament, and he differed from his father in recognising how far he could carry his opposition. The Declaration of Breda was drawn up so as to throw the whole responsibility of the settlement upon Parliament. Thus there was a general pardon to all except those specially exempted by Parliament, and Parliament was to settle the terms on which all confiscated estates were to be retained or restored by their new owners. Charles offered to agree to a Bill for the payment of arrears due to the soldiers, and another one to provide "a liberty for tender consciences." In the Act of Indemnity, fourteen who had taken prominent parts against Charles the First found themselves excluded from pardon and were executed, and others suffered fines, imprisonment, or exile. The estates of the crown and church were restored; but the private sale of land was declared valid, even though it had been necessitated by the imposition of an exorbitant fine. Study the attempt at religious toleration and the subsequent religious quarrels, the Clarendon Code, and the position of the Roman Catholics.

The great struggle for maritime supremacy went on during this period. In their struggles for independence, the Dutch had greatly developed their shipping, and after the Treaty of Westphalia improved their ships to such an extent that they secured practically the whole of the carrying trade of Europe. In 1651 the English Parliament passed the Navigation Act, as a means of increasing English trade at the expense of the Dutch. This Act forbade the importation of goods into England unless they were brought in English ships, or in vessels belonging to the country in which the goods were produced. This led to the Dutch War of 1652–3, in which many battles were fought. Van Tromp defeated Blake in November 1652, but was defeated by him in the following February. The Act was withdrawn, but was re-enacted by the Convention Parliament in 1660, and the ill-feeling broke out into open hostilities in 1664. The English captured some Dutch ships and the settlement in America called New Amsterdam, which they renamed New York, in honour of the Duke of York, who was Lord High Admiral. De Ruyter seized some English forts and factories in Guinea, and war was formally declared in 1665. In June of that year the Duke of York defeated Admiral Opdam off Lowestoft (generally called the battle of Sole Bay). The Dutch called upon the French for help under a treaty; but Louis the Fourteenth desired to see the English and Dutch fleets destroy one another, and he really did nothing. In June 1666, De Ruyter and Van Tromp defeated the English under Monk and Prince Rupert; but the English rallied, and inflicted a severe defeat on their opponents, and harassed the Dutch coast right up to the Texel, capturing or destroying one hundred and sixty merchant ships. The following year Louis advanced into the Netherlands, and the Dutch were anxious to make peace; and Charles was so anxious to save the money voted for the navy that he paid off the sailors before peace was signed. De Ruyter then sailed up the Thames and Medway, burnt three men-of-war, and captured a fourth. By the Peace of Breda, the English gave up their claim to the East Indian spice islands, but secured the colonies taken from the Dutch in America. Soon after this the English were temporarily in alliance with the Dutch and Swedes, the object being to prevent the encroachment of Louis on the frontiers of the Netherlands. Louis contrived to detach Charles from this alliance by the Treaty of Dover. War broke out again in 1672, in March of which year the English fleet attacked a number of Dutch merchantmen in the Channel, but captured only two. On June 7, De Ruyter fought the combined English and French fleets in Southwold Bay. The battle was indecisive, but the English retired without renewing the fight next day. In June 1673, De Ruyter compelled the English and French fleets to retire from the coast of Holland, owing to the failure of the French to support their allies, and to the skilful manœuvring of the Dutch in the shallow water. This caused popular feeling to veer round in favour of the Dutch, and a treaty was signed in February 1674. From that time onward the English and Dutch acted in unison in trying to curb the ambition of the French monarch. The Dutch took a small part against England during the American War of Independence, and the next serious conflict did not come about until the war of the French Revolution, when the Dutch, having allied themselves with the French, paid for it by the loss of most of their colonial possessions, and the defeat of their ships at Camperdown, October 1797, and the Helder, September 1799.

We have worked out this topic in full, in order to show how connected accounts of great movements should be treated.

Our relations with France during the period should be treated in the same way. Ecclesiastical matters and the settlement of the constitution require similar treatment.

Geography.

Revise the geography of England and Wales, and study that of China and Japan. The geography of the Russian possessions in Asia must be studied in connection with their history, and with the Russian policy of expansion. The three objects of the latter are—(1) to secure an outlet on the Persian Gulf; (2) to open an overland route to India; and (3) to secure ice-free ports on the Pacific. In pursuit of the first object Russia has absorbed the Caucasus and the Transcaucasian region. By means of loans, etc., she has secured great influence and concessions in

Persia, and it is believed that by a secret treaty she has secured the lease of Bender Abbas, and the concession for the construction of a railway across Persia to that port. Having failed to secure a free passage through the Bosphorus, Russia has advanced her frontiers in Central Asia, until now on the Pamirs they are only twenty miles distant from the British Indian frontier; and she has endeavoured, with varying success, to supplant British influence in Afghanistan and Tibet. After the war between China and Japan, Port Arthur was ceded to the latter; but Russia, backed up by Germany, professing to act in the interests of China, put such pressure upon Japan that Port Arthur was restored to China. Great was then the mortification of the Japanese when they found that Russia secured the possession of this port and fortress, nominally on a lease, but really under her absolute control. The Boxer insurrection gave the Russians an excuse for occupying the large Chinese province of Manchuria, and it is doubtful whether they will ever give it up. This province is better suited for the settlement of Europeans than any other part of Asia, except other parts of China and Japan which are already densely populated, and it offers a great temptation to Russia, who will, no doubt, develop it into a valuable possession. The fixed intention of Russia in that matter is shown by the trouble taken in constructing the Trans-Siberian Railway, which unites St. Petersburg with Port Arthur and Vladivostock, and opens up the vast fertile plains of Southern Siberia to Russian settlement. The route taken by this railway should be carefully studied.

After the defeat of China by Japan had shown the world how weak the Chinese Empire really was, the Western nations began to talk of its dismemberment. In 1897, on pretext of protecting German missionaries in China, Germany seized the port of Kiau-Chau, and set about making it an important commercial and political centre. Railway concessions were secured, and lines constructed into the neighbouring provinces, which were thus brought within the German "sphere of influence." In March 1898, Russia secured the lease of Port Arthur, and England received Wei-Hai-Wei in April 1898, to be held "as long as Russia should hold Port Arthur." The place is, however, of little value compared with Port Arthur. France naturally wanted something as a set-off, and obtained the Bay of Kwang-Chau-Wan on a lease for ninety-nine years.

Arithmetic.

Study the chapters on ratio and proportion most thoroughly, for nearly all the subsequent rules depend on a knowledge of proportion. All the theorems connected with ratio and proportion are best understood if it is remembered that a ratio is merely a fraction, either proper or improper. It is an *abstract* number, showing how many times one quantity is contained in another, and, of course, it follows from this that the two quantities must be of the same kind.

Geometry.

Study the fourth book. This book consists of propositions which are long but easy. The only one requiring much thought is the tenth, and this is not difficult if the student analyses it first.

Algebra.

Study the chapter on simultaneous equations. Notice that there must be as many independent equations as there are unknowns; and the method of solution, if there are two unknowns, consists in constructing from the two given equations one equation with one unknown. And however great may be the number of unknowns and of corresponding equations, the principle involved in the solution is the same; for we work in steps, and first make a series of equations, one less in number and containing one fewer unknown quantities. In the next step the number of equations and of unknowns is reduced by one, and so on until there is only one unknown, and this is found by the methods that are now familiar. In reducing the number of unknowns, the student has a choice of three methods:—

1. He may multiply both sides of each equation by appropriate numbers, so as to bring the coefficients to the same in a pair of equations; then by adding if the signs of the similar terms are unlike, and subtracting if they are alike, one of the unknowns will disappear.

2. The value of one of the unknown quantities may be found in terms of the other in one of the equations, and this value may be substituted for it in the other equation. This causes one of the unknowns to disappear. This method is generally the one to be recommended when one of the unknowns in either equation has unity for its coefficient.

3. The value of one unknown may be found in terms of the other in *each* equation. Then since these expressions are each equal to this unknown, we may form a new equation by stating that they are equal to one another, and in this way one of the unknowns will be eliminated. This method is not generally so expeditious as (1) or (2), but the student should practise it because it involves a principle which is often applied in other branches of mathematics.

In following the first method, the student will find the most convenient common coefficient to use is that which is the L.C.M. of the original coefficients, and the working is kept down by selecting that unknown whose coefficients have the smallest or simplest L.C.M. For example,—

$$\begin{cases} 9x + 10y = 57. \\ 8x - 5y = 9. \end{cases}$$

In this case the L.C.M. of 9 and 8 is 72, and if we set about eliminating x first, we must multiply the equations by 8 and 9 respectively. On the other hand y may be eliminated by multiplying the second equation by 2, and adding the two equations together.

$$9x + 16x + 10y - 10y = 57 + 18.$$
$$25x = 75.$$
$$\therefore x = 3.$$

The student has an opportunity of showing his intelligence by selecting that treatment for each example which is most appropriate to it.

Elementary Science.

We now want to take up the study of the bean plant as a type of an ordinary flowering plant. If a growing plant be examined, it will be found that from the underground *root* springs an erect *stem*, bearing leaves on opposite sides of succeeding nodes. At the end of the stem is the growing point or *bud*. Buds are also developed at the nodes, and as the plant matures some of these form stalks which end in *flowers*. The flower will be seen to consist of a green cup or *calyx*, having five points corresponding to *sepals*, which in many plants are not connected one to another. Within this cup is a series of five petals, which together constitute the *corolla*. On the back of the flower, and as the flower bends over this generally appears at the top, is a large folded piece called the *vexillum* or standard; at the side are two oval petals called the *alæ* or wings; while, underneath, are two smaller parts lightly joined together and called the *carina*—that is, the keel or hull. If the corolla is removed a tube makes its appearance, which consists of ten rodlike bodies with knobs at the top. These are the *stamens*. The rod is called the *filament*, and the knob at the top the *anther*. In the case of the bean flower, it will be observed that the filaments are joined together for about two-thirds of their length, and that four of them are shorter than the rest. If an anther be pulled open by two fine needles with the help of a lens and examined under a microscope, it will be found to consist of a small sac or case filled with a fine dust called *pollen*. It is advisable to go to another flower for further information respecting the anther, and we should recommend a lily—either the white garden lily (*Lilium candidum*) or the *Lilium auratum*. The student no doubt knows that the anthers of these flowers open spontaneously soon after the flower opens, and discharge such an amount of dark yellow dust that florists and others who grow them frequently nip the anthers off to prevent them from spoiling the appearance of the flower.

On removing the stamens a long green tapering body is left in the middle. This is the *pistil*, and its pointed end, furnished with hairs, is called the *style*. If this is carefully opened, it will be found to hold within its central cavity a number of small round bodies called *ovules*. On examining an ovule under the microscope a little passage—*micropyle*—will be seen leading through its two coats to a cellular portion in the middle called the *nucleus*.

Fertilisation consists in the attachment of a pollen grain to the style, the development of a thread from this grain, which passes right down to the ovule, enters the micropyle, and reaches the nucleus. When its protoplasm fuses with that of the nucleus, the ovule increases in size, and becomes a *seed*, from which a new plant may be obtained in the next season. The tissues which go to the building up of the stem should be carefully studied and compared with those in the bracken.

A cross section shows a cavity in the middle containing a loose substance—*pith*. In the very centre of this is a clear space called the *pith cavity*, or *medullary cavity*. The pith cells are large and nearly spherical, as they have not suffered much from mutual pressure. Outside this is a ring of whitish *fibro-vascular bundles*. These bundles consist of cells which are very much elongated so as to form *ducts* and *vessels*, and smaller thick-walled *wood-cells*, which are wedged in between the latter. Outside these is a thin ring of soft cells which divide continually during the life of the plant, and add material to the outside of the inner portion—the *xylem* or woody tissue; and to the inside of the outer ring—the *bast* or *phloem*. This layer of soft tissue is called the *cambium*.

OUR SCIENCE SECTION

☞ **Subscribers requiring Explanations of Difficulties in any branch of Science, or Advice upon Courses of Study, can obtain all help required by communicating with the Editor, and accompanying their query with the Coupon cut from this Number.**

CHEMISTRY.

(ADVANCED AND HONOURS.)

BY C. A. WEST, B.SC., A.R.C.S., F.I.C.

Artificial Production of Rubies.—Auguste Verneuil has recently shown that artificial rubies in the form of spheroids, having a diameter of 5 to 6 mm. and weighing 2·5 to 3 grams (12 to 15 carats), can be obtained by allowing a blowpipe flame, rich in hydrogen or carbon, to play on the extremity of a small cylinder of alumina, while a mixture of alumina and 2·5 per cent. of chromium oxide in the form of a powder is mechanically blown with the oxygen into the tube of the blowpipe, and thus deposited on the surface of the fused mass of alumina. The artificial stones thus obtained are identical in physical and crystallographical properties with the natural gems, from which, however, they can be distinguished by the presence of minute bubbles visible only under the microscope.

Phosphorescent Zinc Sulphide.—Pure zinc sulphide is not phosphorescent, but the addition of a trace of copper, silver, lead, bismuth, tin, uranium, or cadmium causes it to become so. Copper produces the best result—1 part of copper in 10,000 causing a beautiful green phosphorescence. The addition of manganese, on the other hand, produces a yellowish-red phosphorescence, and the zinc sulphide in this case, when scratched or rubbed, emits light spontaneously. Hexagonal zinc sulphide, Sidot's blende, glows intensely under the influence of a small amount of ozonised oxygen, and also scintillates. The blende scintillates feebly when kept in a dark room, removed from all radio-active substances and from ozone.

Action of Carbon Dioxide on Magnesium Hydroxide.—When a current of carbon dioxide is passed through water in which magnesium hydroxide is suspended, a liquid is obtained containing a varying amount of magnesium oxide. In three experiments the following figures were obtained respectively: 10·7, 9·7, and 11·3 per cent. By prolonged heating at 50° to 60°, or by adding an equal volume of alcohol, carbon dioxide is gradually evolved, and a precipitate is obtained having the composition $MgCO_3$, $3H_2O$. The portion not dissolved by the water also has the same composition, but it obstinately retains some 3·7 per cent. of unchanged magnesium hydroxide.

Helium and Neon from Air.—Taking advantage of the selective absorptive power exhibited by wood charcoal towards gases, Sir James Dewar has separated the oxygen and nitrogen from the more volatile gases of the air. The unabsorbed residue from 200 c.c. of air showed, when spectroscopically examined, the C and F lines of hydrogen, the yellow and some orange lines of neon, and the yellow and green lines of helium. By this method also the presence of helium has been detected in the gases from the mineral waters of Bath, of neon in the gases from London water and sea-water, and of neon and hydrogen in the gases dissolved in petroleum.

Liquefaction of Helium.—Sir James Dewar has shown that when a tube full of hydrogen and connected with a side tube containing wood charcoal is cooled in liquid hydrogen, the hydrogen is absorbed by the charcoal, producing a vacuum of so high an order that an electric discharge in the tube is impossible. When the tube of hydrogen is replaced by one of helium and cooled to 15° absolute, a coil capable of producing a spark 40 cm. long in air only causes an intermittent phosphorescence in the middle of the tube. Sir James Dewar concludes from his experiments that the boiling-point of helium is about 6° absolute.

A Reagent for Phosphorus, Arsenic, or Antimony Hydride.—Paul Lemoult, in the *Comptes rendu*, 1904, p. 139, gives an account of the use of mercuric iodide as a reagent for the hydrides of phosphorus, arsenic, and antimony. When hydrogen phosphide is passed into a solution of mercuric iodide containing potassium iodide (HgI_2, nKI, with $n > 2$), an orange-yellow crystalline solid is formed, which becomes brick-red when dry, has the composition PHg_3I_3, is decomposed slowly by hot or cold water, more rapidly by alkalis, forming an iodide and a black powder, which in its turn breaks down into hydrogen phosphide, mercury, and an alkali phosphite. Nitric acid or aqua regia decomposes the compound readily—the former giving a mercury iodonitrate, $HgINO_3$, and phosphoric acid; the latter liberating iodine, and yielding phosphoric acid and a mercury salt.

Similar characteristic compounds are obtained when arsenic or antimony hydride replaces the hydrogen phosphide in the above reaction, the arsenic compound having a brown, and the antimony a brownish-black, colour. Ammonia only reacts with concentrated solutions of the reagent, giving the compound HgI_2, $2NH_3$, in beautiful crystalline needles 1 cm. long.

Probable Value of the Gas Constant R.—Daniel Berthelot has published a discussion on the most probable value of the gas constant R, of which the following is a digest:—

The value of R in the equation $pv = RT$ can be obtained from observations on real gases, if p is taken small enough. For the permanent gases, the curves representing pv as a function of p (at constant temperature) are straight lines up to 5 or 6 atmospheres. It is therefore possible to calculate the value of pv, for $p = 0$, with great accuracy. The data required are the molecular weight of the gas, the weight of a litre of the gas under standard conditions, and the compressibility of the gas between 0 and 1 atmosphere. From the results obtained for seven gases by Leduc and Sacerdote, and using the atomic weights of the International Commission, the volume occupied by 1 molecule of a perfect gas under standard conditions is found to be 22·4135 litres, and, using Lord Rayleigh's measurements on three gases, 22·4098. A rather better agreement is obtained when the more accurate atomic weights H = 1·0076 and C = 12·004 are used, the numbers becoming 22·4130 and 22·4116 respectively.

Gases containing nitrogen give considerably higher values when Stas's atomic weight (14·04) is used, but taking N = 14·005, the normal value is found. Berthelot considers that the atomic weight 14·04 is certainly too high. In order to calculate the value of R, the melting-point of ice on the absolute scale is required. From Joule and Thomson's results, combined with the accurate measurements of the coefficients of expansion of hydrogen, air, and carbon dioxide made by Chappius, the mean value $T_0 = 273{\cdot}10$ is obtained. From Chappius's measurements of the coefficients of expansion and of compressibility of nitrogen and of hydrogen, the value 273·08 is calculated. The mean of these two numbers is taken, and leads to the final value,—

$$R = \frac{22{\cdot}412}{273{\cdot}09} = 0{\cdot}08207;$$

the units being the atmosphere and the litre. The uncertainty of this number is about one unit in the last place.

Some Important Physico-chemical Constants.—Using the values found by Berthelot for R, Professor Walther Nernst has calculated the following values: $R = 0{\cdot}83155 \times 10^8$ (erg T^{-1}) or $R = 1{\cdot}98507$ (gram calories T^{-1}). The latter value is calculated taking the mechanical equivalent of heat as $41{\cdot}89 \times 10^6$ erg for the 15° gram calorie. Since 1 watt = 0·23872 gram cal., $R = 0{\cdot}86134 . 10^{-4}$ (watt). Finally, the molecular weight of an ideal gas is 28·979 Δ, where Δ is its density referred to air as unity.

Becquerel Rays Produce Colour.—An account is given in the *Comptes rendu*, 1904, p. 139, by C. J. Salomonsen and G. Dreyer of their observations on the colorations produced by radium salts. Plates of quartz exposed to the action of radium salt become strongly coloured. The minute examination of such plates cut perpendicular to the optical axis shows the presence

of a system of lines and striæ parallel with the binary axes of the crystal. Adjacent portions of the striated system differ considerably in the intensity of the coloration, and exposure of the quartz to radium thus shows clearly its heterogeneity of structure. The coloration of glass by Becquerel rays affords a means of quantitative measurement, a scale of standards being easily obtained by exposing glass to pure radium salt for different times. The sensitiveness of the glass depends on the composition. Jena borosilicate crown glass (No. 3,453) is found to be particularly sensitive.

Water and Becquerel Rays.—Kohlrausch has investigated the effect of the Becquerel rays on the electrical conductivity of water. The conductivity of water exposed to radium rays increases more rapidly than that of water contained in the same vessel but not similarly exposed. This additional increase of conductivity in the case of the exposed water corresponds with an increase in the ions of about $\frac{1}{10^{5}}$ of a milligram per day. The ions may be produced from the water by the exposure, or the rays may accelerate the solution of the glass. If a current of air is led over the radium salt and then through the water, the latter shows no increase of conductivity.

Radium Emanations and Diamonds.—Sir William Crookes has made the following observation. An "off colour" diamond of a very pale-yellow colour was put inside a tube with radium bromide, and after seventy-eight days the diamond had darkened and become bluish green in tint, no yellow colour being apparent. When heated at 50° in a mixture of nitric acid and potassium chlorate for ten days, the diamond lost its dull surface colour, and was bright and transparent, but its tint had changed to a pale bluish green.

The radium emanations have accordingly a double action on the diamond. The β rays effect a superficial darkening, converting the surface into graphite in a manner similar to, but less strongly than, the more intense electrons in the cathode stream.

In the presence of radium the diamond is extremely phosphorescent, and continues to shine during the time of the experiment.

The diamond, which had been submitted to the action of radium, was still strongly radio-active after it had been away from radium for thirty-five days, for ten of which it was being heated in a mixture powerful enough to dissolve its outer skin of graphite.

Magnetisation of the Alkali Metals.—By means of a modified torsion balance, the coefficients of magnetisation of sodium, potassium, and lithium have been measured. The values obtained are respectively $0{\cdot}5438.10^{-6}$, $0{\cdot}632.10^{-6}$, and $0{\cdot}3836.10^{-5}$. These coefficients diminish with temperature, and do not undergo a sudden change with a change of state. The values obtained show that the alkali metals are paramagnetic, and not diamagnetic, as supposed by Faraday.

Helium from Radium Emanation.—F. Himstedt and George Meyer have confirmed the observations made by Ramsay and Soddy, and by Dewar and Curie, that helium is produced from the emanation of radium. In their experiments the most stringent precautions (for example, heating for 20 to 30 minutes in a vacuum at a bright red heat) were taken to free the radium preparations from occluded helium. But in spite of these it appears that fresh helium is produced from the radium preparations after a longer or shorter interval.

Emanium and Actinium.—André Debierne contends that the substance described by Giesel and named emanium is identical with actinium. The elements associated with each are the same, the phosphorescence phenomena are identical, and so are the time constants of the decay of the induced activity.

As a result of fractionating the rare earths by means of the double nitrates which the rare earth metals form with manganese, it is found that the actinium accumulates in the neodymium and samarium fractions, the lanthanum fraction being almost inactive.

PHYSIOGRAPHY.

(STAGES 2 AND 3.)

SPECTROSCOPY.

WE have seen that when sunlight passes through a small hole and falls on a prism and is transmitted, the light is separated into its constituents, and we get a spectrum as a result. Without at this moment entering into a discussion as to the real nature of light rays, we may usefully assume that they are a wave motion of the ether which is supposed to pervade all space. If light is a wave motion of the ether, it is necessary, then, for us to know something of wave motions in general, if we are to understand the effects observed in the spectroscope. Let us first take the case of water waves. Suppose we are standing on the embankment of a canal, and a series of regular waves are passing over the surface. If we can make a rough estimate of the number of waves passing us in one second, and can also tell approximately the distance from the crest of one wave to the crest of the next, then we can find the velocity with which the waves are travelling. The total length of the waves passing in one second will evidently be obtained by multiplying together the number of waves which pass in one second by the length of one wave. The length of waves passing in one second, however, is the same as the distance travelled in one second, and this is the velocity. We may express this in the form of an equation thus: $V = nl$, where V is the velocity, n is the number passing per second, and l is the length of one wave.

As a second example let us take the case of sound waves. Suppose a note of definite pitch—for example, that of a whistle—is being produced at some fixed distance. A number of waves reach us, and if the pitch of the note as heard by us remain constant, this means that the same number of waves reaches us each second, and also that the length of each wave is the same; for the waves will be equidistant from each other, and will travel with the same velocity. Now, the number of waves per second which reaches us determines the pitch of the note as heard.

Suppose the number of waves reaching us per second is 256; then the note heard is that which is known to musicians as middle C. Now, suppose we know the velocity with which all sound waves travel at the temperature of the experiment, we can calculate the wave-length. The velocity of sound waves in air at 0° C. is about 1,090 feet per second, and the velocity increases about 2 feet per second for every degree rise in temperature. If the temperature is 31° C., the wave-length will be $\frac{1152}{256} = 4\frac{1}{2}$ feet. If, now, by any means we alter the number of waves reaching us per second, we alter the pitch. To take an extreme case, suppose we could travel away from the source of sound with the same velocity as the sound waves travel: none of the waves would overtake us, and the pitch would be zero. If we receded with only half this velocity, then half the number of vibrations (that is, 128) would reach us, as against 256 if both we and the whistle remained stationary. Of course, the whistle would still be giving 256 vibrations per second, and the *true pitch* would still be 256, but the *apparent pitch* of the note as heard by us would be 128. The wave-length, or the distance between two waves, would still be the same. If instead of travelling away from the whistle we travelled towards it, for similar reasons the number of waves reaching us per second would be increased, or the apparent pitch would be raised. In neither of these cases is the wave-length altered. Suppose now that we remain stationary, and that the whistle moves away from us. In this case the distance between two consecutive waves reaching us will be increased, or in other words, the wave-length is increased. That this is so will be evident from the following considerations. To make the matter as simple as possible, suppose that the whistle at the start is 1,152 feet from us. At the end of one second the first vibration will just have reached us. At the end of $\frac{1}{256}$ part of a second after the first vibration has started out, the second vibration will be leaving the whistle; but if during this time the whistle has moved, say, through $4\frac{1}{2}$ feet away from us, the distance between the first and second waves will be 9 feet, for the first one will have travelled $4\frac{1}{2}$ feet towards us. The distance between these two waves will always remain the same; for having once left the whistle, they will travel with the same velocity as each other, and with a velocity independent of the further motion of the whistle. Hence, when at the end of one second the first wave reaches us, the second will be 9 feet behind it, and in the same way the third will be 9 feet behind the second, and so on.

Hence the new wave-length is 9 feet, and since the velocity is 1,152 feet, the number of waves reaching us per second is $\frac{1152}{9} = 128$; or the apparent pitch is 128, while the true pitch of the note, or the number of vibrations given out per second by the whistle, is 256. Of course, if the velocity of the whistle were less, it would have less effect on the apparent pitch of the note.

It will be evident that if the whistle approaches us the apparent pitch will rise, because the wave-length will be shortened.

The above examples will make it quite clear that it is not a simple case of relative motion: for under the above conditions we see that if we recede from the whistle with the velocity of sound, the pitch decreases from 256 to 0; while if the whistle recedes from us at the same rate, the pitch is only reduced from

256 to 128. By reasoning on the same lines, we can easily find the effect on the apparent pitch, if both the source of sound and the observer are moving.

It will now be evident that if we are stationary, and if a source of sound is moving towards us or away from us, and we know the true pitch and apparent pitch, as well as the velocity of sound, we can calculate the rate at which the body is moving towards or away from us.

The principle involved in the foregoing changes of pitch is known as *Doppler's principle*. It applies equally to light waves, and is of great importance in the spectroscopic examination of stars, and its applications will be noted as we proceed.

(*Note.*—The description and diagram of the spectroscope have been held over until next month.)

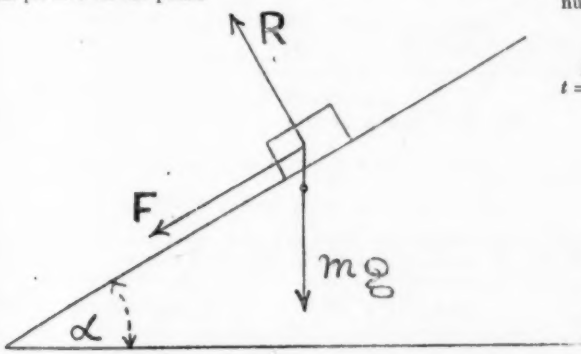
THEORETICAL MECHANICS.

Stages 2 and 3, and Intermediate Science, London University.

BY FRANK CASTLE, M.I.M.E.,

Royal College of Science; Lecturer on Mechanics, etc., Morley College, London; Author of "Elementary Practical Physics," "Practical Mathematics," etc.

Motion on an Inclined Plane.—Let w denote the weight and m the mass of a body on a plane at an angle α to the horizon. The force $w = mg$ may be resolved into two components along the plane and perpendicular to it. The former, which may be denoted by F, produces the acceleration of the body: its magnitude is $mg \sin \alpha$. The latter, denoted by R, of magnitude $mg \cos \alpha$, gives the pressure on the plane.



If V denotes the initial velocity, v the velocity at the end of a time t, s the space described, and f the acceleration, then in the three well-known equations $v = V \pm ft$, $s = Vt \pm \frac{1}{2}ft^2$, $v^2 = V^2 \pm 2fs$, it is only necessary to substitute $g \sin \alpha$ for f, and for motion *down* the plane we obtain the relations $v = V + g \sin \alpha t$, $s = Vt + \frac{1}{2}g \sin \alpha t^2$, $v^2 = V^2 + 2g \sin \alpha s$.

If the body starts from rest—that is, if the initial velocity is zero—the velocity at the end of a time t is given by $v = g \sin \alpha t$, and the space described by $s = \frac{1}{2}g \sin \alpha t^2$.

When the surfaces in contact are rough, the friction between them, when one surface is made to slide over the other, will act in the opposite direction to that in which motion takes place.

The retarding force due to friction when motion occurs is $\mu R = \mu mg \cos \alpha$, where μ denotes the coefficient of friction for the surfaces in contact. If F be the resultant force, then $F = mf = mg \sin \alpha - \mu mg \cos \alpha$, or, $f = g \sin \alpha - \mu g \cos \alpha$. This relation may be used to determine the numerical value of μ. Thus, if the inclination of the plane be such that the body moves with *uniform* speed, the acceleration is zero, and we obtain—

$$g \sin \alpha - \mu g \cos \alpha = 0. \quad \therefore \mu = \tan \alpha.$$

By the aid of elementary mathematics the preceding equations may be obtained more directly as follows:—

The resolved part of mg is $mg \sin \alpha$, and as acceleration = force ÷ mass, we obtain f, or $\frac{d^2s}{dt^2} = g \sin \alpha$.

$$\therefore v = \frac{ds}{dt} = g \sin \alpha t + C.$$

The constant C is obtained by inserting the value of V when $t = 0$; if this be V, then $v = V + g \sin \alpha t$.

If $v = 0$ when $t = 0$, then $v = g \sin \alpha t$. Similarly $s = \frac{1}{2}g \sin \alpha t^2$.

Ex. 1. What is the relation between the acceleration of the velocity of a body of given mass and the force producing the velocity?

(*a*) Find the force which in three seconds will communicate a velocity of 27 ft. a second to a mass of 10 tons.

(*b*) The slope of a smooth inclined plane is 1 foot vertical to 3 feet horizontal; find the acceleration of the velocity of a body sliding down it, and the distance described in 5 seconds from rest. (Stage II., 1904.)

($g = 32{\cdot}2$, $\sqrt{10} = 3{\cdot}16$.)

(*a*) Let F denote the force; then—

$$F = \frac{10 \times 2240}{3 \times 32{\cdot}2} \times 27 = 6260{\cdot}8 \text{ lbs.}$$

(*b*) The sine of the angle is $\frac{1}{\sqrt{10}}$.

$$\therefore f = g \sin \alpha = \frac{32{\cdot}2 \times 1}{\sqrt{10}} = \frac{32{\cdot}2\sqrt{10}}{10} = 10{\cdot}19 \text{ f.s.s.}$$

$$s = \tfrac{1}{2}ft^2 = \frac{16{\cdot}1 \times 25}{\sqrt{10}} = 127{\cdot}4 \text{ feet.}$$

Ex. 2. The inclination of a railway is an angle whose sine is $\frac{11}{480}$; a carriage descends by its own weight, and moves through a distance of a furlong in the first minute. Find the coefficient of friction, and also how far the carriage will move in the next minute. (B.A., 1900.)

If μ denotes the coefficient of friction, then

$$f = g \sin \alpha - \mu g \cos \alpha.$$

$$\text{As } \sin \alpha = \frac{11}{480}, \ \therefore \cos \alpha = \sqrt{\left\{1 - \left(\frac{11}{480}\right)^2\right\}} = \frac{479{\cdot}9}{480}.$$

The numerical value of $\cos \alpha$ is very nearly equal to unity; hence the angle is very small, and may be taken to be 0°, and its numerical value equal to unity, without any appreciable error.

$$\therefore f = g \times \frac{11}{480} - \mu g.$$

From the relation $s = \frac{1}{2}g \sin \alpha t^2$, where $s = 220 \times 3$ feet, and $t = 60$, we obtain—

$$660 = \frac{g}{2}\left(\frac{11}{480} - \mu\right)3600.$$

$$\therefore \frac{66}{360} = \frac{g(11 - 480\mu)}{960}.$$

$$\therefore 480\mu g = 11(32 - 16) = 11 \times 16,$$

$$\text{or } \mu = \frac{11 \times 16}{480 \times 32} = \frac{11}{960}.$$

As the distance described is proportional to the square of the time, it follows that in twice the time it will move through four times the distance; ∴ distance described in the next minute will be $660\,(4 - 1) = 1980$ feet.

Ex. (*a*) How long in time and distance will a bicycle run freely down an incline of one in sixteen before attaining a velocity of 15 and 30 miles an hour?

(*b*) Prove that the time occupied on a railway worked by gravity between two stations at the same level, connected by two inclines of length a feet, descending a depth h feet, is $4a/\sqrt{2gh}$ seconds—the train passing the junction of the incline without shock and neglecting passive resistances. (Inter. Sci., 1902.)

(*a*) From the relation $g \sin \alpha t$, where $\sin \alpha = \frac{1}{16}$, we obtain—

$$\frac{15 \times 5280}{60 \times 60} = g \times \tfrac{1}{16} \times t.$$

$$\therefore t = \frac{15 \times 5280 \times 16}{60 \times 60 \times 32} = 11 \text{ seconds.}$$

The distance described in a time t is given by

$$s = \tfrac{1}{2}g \sin \alpha t^2 = \tfrac{1}{2}g \times \tfrac{1}{16} \times 121 = 121 \text{ feet.}$$

In a similar manner the time and distance required to attain a velocity of 30 miles an hour are 22 seconds and 484 feet respectively.

(*b*) The time occupied in describing a length a feet on a plane inclined at an angle α is given by

$$s = a = \tfrac{1}{2}g \sin \alpha t^2.$$

$$\therefore t^2 = \frac{2a^2}{gh} = \frac{4a^2}{2gh}.$$

$$\text{Hence } t = \frac{2a}{\sqrt{2gh}}.$$

As the time on the second plane is of like amount, we obtain

$$t = \frac{4a}{\sqrt{2gh}}.$$

OUR QUERY COLUMN.

RULES (as usual).

Student.—Find the value of

$$\frac{1+x}{1+\sqrt{1+x}}+\frac{1-x}{1-\sqrt{1-x}},$$

when $x=\frac{\sqrt{3}}{2}$.

Substituting the given value of x, we have—

$$\frac{1+x}{1+\sqrt{1+x}}+\frac{1-x}{1-\sqrt{1-x}}$$

$$=\frac{1+\frac{\sqrt{3}}{2}}{1+\sqrt{\frac{\sqrt{3}}{2}+1}}+\frac{1-\frac{\sqrt{3}}{2}}{1-\sqrt{1-\frac{\sqrt{3}}{2}}}$$

$$=\frac{\frac{2+\sqrt{3}}{2}}{1+\frac{\sqrt{(2+\sqrt{3})}}{\sqrt{2}}}+\frac{\frac{2-\sqrt{3}}{2}}{1-\frac{\sqrt{(2-\sqrt{3})}}{\sqrt{2}}} \quad \ldots\ldots (1).$$

Let $\sqrt{(2+\sqrt{3})}=\sqrt{x}+\sqrt{y}$.

Then $2+\sqrt{3}=x+y+2\sqrt{xy}$.

$\therefore x+y=2$, and $2\sqrt{xy}=\sqrt{3}$.

Hence $x-y=\sqrt{(2^2-3)}$. $\therefore x-y=1$. But $x+y=2$.

$\therefore x=\frac{3}{2}$, and $y=\frac{1}{2}$.

Hence $\sqrt{(2+\sqrt{3})}=\frac{\sqrt{3}+1}{\sqrt{2}}$.

Similarly $\sqrt{(2-\sqrt{3})}=\frac{\sqrt{3}-1}{\sqrt{2}}$.

Therefore (1) may be written—

$$\frac{\frac{2+\sqrt{3}}{2}}{1+\frac{\sqrt{3}+1}{2}}+\frac{\frac{2-\sqrt{3}}{2}}{1-\frac{\sqrt{3}-1}{2}}$$

$$=\frac{2+\sqrt{3}}{3+\sqrt{3}}+\frac{2-\sqrt{3}}{3-\sqrt{3}}$$

$$=\frac{(2+\sqrt{3})(3-\sqrt{3})}{(3+\sqrt{3})(3-\sqrt{3})}+\frac{(2-\sqrt{3})(3+\sqrt{3})}{(3-\sqrt{3})(3+\sqrt{3})}$$

$$=\frac{6+\sqrt{3}-3}{9-3}+\frac{6-\sqrt{3}-3}{9-3}$$

$$=\frac{6+\sqrt{3}-3+6-\sqrt{3}-3}{6}=1.$$

College.—A man weighing 12 stones and a sack weighing 10 stones are suspended over a smooth pulley by a rope whose weight may be neglected. Find their common acceleration. If in the foregoing example the man pulls himself up by the rope so as to diminish his downward acceleration by one-half, find the upward acceleration of the sack in this case, and prove that the acceleration of the man upwards relative to the rope will be 3·2 (foot second units).

From the formula $f=\frac{P-Q}{P+Q}\cdot g$, we see that the acceleration of the man downwards in the first case will be $\frac{12-10}{12+10}\cdot g$, or $\frac{g}{11}$. Hence, by question, the acceleration of the man downwards in the second case will be $\frac{g}{22}$. Let T be the tension of the rope (in stones) in this case. Then we have for the acceleration of the man downwards $\frac{12-T}{12}\cdot g$.

$$\text{Hence } \frac{12-T}{12}\cdot g=\frac{g}{22}.$$

$$\therefore T=\frac{126}{11}.$$

The acceleration of the sack upwards is therefore

$$\frac{\frac{126}{11}-10}{10}g=\frac{16}{110}\cdot g.$$

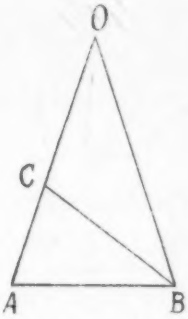
Hence the acceleration of the rope downwards, on the same side of the pulley as the man, is $\frac{16}{110}\cdot g$.

But the acceleration of the man is $\frac{g}{22}$ downwards. Hence the acceleration of the man *upwards relative to the rope* is $\frac{16}{110}g-\frac{g}{22}$; that is, $\frac{16-5}{110}\cdot g$, or $\frac{g}{10}$.

Bellows.—The statement quoted by you is incorrect. The pressure of the enclosed air remains constant.

W.J.W.—In the figure of Euclid IV. 10 the side of the triangle is 1½ inches. What is the length of the base?

In Euclid IV. 10 it is shown that OC = CB = BA, and OA . AC = AB².



But AC = OA − OC.

$\therefore$ AC = OA − AB.

Hence OA(OA − AB) = AB².

Let x denote the length of the base AB.

Then, since the side OA is 1·5 inches, we have

$$1\cdot5(1\cdot5-x)=x^2.$$

Hence $x^2+1\cdot5x-2\cdot25=0$.

Solving this equation, we have

$$x=\frac{-1\cdot5\pm\sqrt{(2\cdot25+9)}}{2}.$$

Since the length of AB is necessarily positive, we must take

$$x=\frac{-1\cdot5+\sqrt{11\cdot25}}{2}.$$

$$\therefore x=0\cdot927\ldots.$$

The length of the base AB is therefore 0·927 . . . . inches.

Bouchier.—Assuming the series for $\log_e(1+x)$ and e^x, show that

$$\left(1+\frac{x}{n}\right)^n=e^x\left(1-\frac{x^2}{2n}\right)$$

nearly, when n is large; and find the next term of the series of which the expression on the right-hand side is the commencement. (Todhunter's *Algebra.*)

Let $y=\left(1+\frac{x}{n}\right)^n$. Then taking logarithms to the base e, we have $\log_e y=n\log_e\left(1+\frac{x}{n}\right)$. Hence, supposing $\frac{x}{n}$ less than unity, we have

$$\log_e y=n\left(\frac{x}{n}-\frac{x^2}{2n^2}+\frac{x^3}{3n^3}\cdot\ldots\right).$$

$$\therefore \log_e y=x-\frac{x^2}{2n}+\frac{x^3}{3n^2}\cdot\ldots$$

$$\text{Hence } y=e^{\left(x-\frac{x^2}{2n}+\frac{x^3}{3n^2}\cdot\ldots\right)}.$$

$$\therefore y=e^x\cdot e^{\left(-\frac{x^2}{2n}+\frac{x^3}{3n^2}\cdot\ldots\right)}.$$

Denote $-\frac{x^2}{2n}+\frac{x^3}{3n^2}\cdot\ldots$ by z.

Then $y=e^x\cdot e^z$.

$$\therefore y=e^x\left(1+\frac{z}{1}+\frac{z^2}{1.2}+\ldots\right);$$

$$\therefore y=e^x\left(1-\frac{x^2}{2n}+\frac{x^3}{3n^2}\cdot\ldots+\frac{z^2}{1.2}+\frac{z^3}{1.2.3}+\ldots\right),$$

where z^2, z^3, etc., consist of terms involving $\frac{x^4}{n^2}$ and higher powers of x and $\frac{1}{n}$.

Therefore $\left(1+\frac{x}{n}\right)^n=e^x\left(1-\frac{x^2}{2n}\right)$ when n is large; and the next term of the series of which the expression $e^x\left(1-\frac{x^2}{2n}\right)$ is the commencement is $e^x\cdot\frac{x^3}{3n^2}$.

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THE EDITOR'S TABLE

NEW GIFT-BOOKS.

ADAM AND CHARLES BLACK.

William Tell Told Again. By P. G. Wodehouse. The history of the Swiss patriot is told in delightfully humorous style. The anachronisms and other forms of pleasantry are deep enough to afford the oldest of us a good laugh, and yet their point will not escape the young folk, for whom the book is intended. The illustrations, which are in colour, are splendid, and a witty verse emphasises the humour of each.

Animal Autobiographies: The Rat. By G. M. A. Hewett. This handsome volume, with its twelve coloured illustrations, is one of a series dealing with the life stories of animals, each from the pen of an accepted authority. The aim of the series is to depict the world as seen through animals' eyes, and the present volume is eminently successful from this point of view. To those who have outgrown fairy tales the book will be very welcome, and will be found very stimulating.

Stories. By Ascott R. Hope. Juvenile stories by Ascott Hope are so well known and so acceptable that it is only necessary to mention the author as sufficient guarantee of the quality of the work. The present collection is formed by extracting from previous volumes, with the result of giving us thirteen good stories. Apart from the interest of these stories, there is much sound moral instruction, which, although not obtrusive, is very effective, making the book, with its coloured illustrations, a very suitable prize for older scholars.

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Grimm's Fairy Tales. Whatever theory one holds about the origin of fairy tales, all will welcome this beautiful edition of the collection made by the brothers Grimm. The English text is carefully written, and the book is well got up and tastefully illustrated, both in colour and in black and white.

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A School History of Great Britain and Ireland. History is taken with much seriousness here, and in the result we have a history manual rather than the reading book which the general get-up leads us to expect. The chapters linking the story of England with those of her sister countries are really good. The subjects of very recent history—the scramble for Africa, the great Boer War, etc.—are treated with commendable clearness and decision, while the chapters on the constitution are uncommonly fresh and informing. The maps are distinctly serviceable; but there are no pictures except the pretty headpieces of the four sections into which the book is divided. The summaries are exceptionally clear and original in their arrangement.

Household Management. This little manual is the direct outcome of the regulations for supplementary courses in domestic economy recently laid down by the Scotch Education Department. Like most small handbooks on domestic economy, it attempts within the scope of eighty pages to cover the whole field of household management, with the inevitable result of securing width at the expense of depth. As an index to the teacher of a girls' course it is useful, though even here it will be found that many of the subjects are relegated to special teachers—for example, cookery, laundry, dressmaking. In fact, domestic economy is not a science but an art, based upon quite a number of sciences, and a more satisfactory method of approach would be to lay down a good groundwork of the main studies concerned—physiology, chemistry, scale drawing—leaving to the living teacher the task of correlating these and applying them to the exceedingly varied syllabus covered by the term household management.

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Macaulay's Oliver Goldsmith and **Samuel Johnson.** H. B. Cotterill, M.A. In these two little books the editor has taken two of Macaulay's essays and added to them chronological summaries of the biographies of Johnson and Goldsmith, with copious notes. The aim of these has been to increase the pleasure of the reading, and to enlarge upon the many interesting topics which Macaulay mentions but briefly. The resulting work gives in an attractive manner an account of many of the prominent figures in an important period of English history.

Mr. Cotterill refrains from commenting on the style of Macaulay, arguing that readers should be led to enjoy rather than to criticise. But since one reads Lamb, De Quincey, and Macaulay partly with a view to acquiring style in composition, we think that the inclusion of this would have been an improvement.

A Manual of Practical Mathematics. By Frank Castle, M.I.M.E. Pp. xii. + 541. This is a thoroughly good book for its purpose. Intended primarily to meet the requirements of the advanced syllabus in practical mathematics of the Board of Education, it will be found very serviceable by all those who have had a fair grounding in the rudiments of mathematics, and who desire some acquaintance with higher mathematics for the purpose of scientific or engineering study. Starting with several chapters of preliminary work in trigonometry and algebra, we are led before the book ends, and by easy stages, to harmonic analysis and differential equations.

It is easy to criticise the details of execution. There is sometimes an over-elaboration of logical accuracy. Thus p. 326 is caviare to the engineer, while p. 318 is rather painful reading for anybody. We should quarrel similarly with several other paragraphs by the omission of which the book would not really suffer. On the other hand, the help given in plotting is insufficient. Thus on p. 78 a pair of simultaneous equations are plotted without any introductory words as to what plotting means. Such introduction would almost certainly be needed by any student who needed p. 43. Again, the variation symbol is used on p. 56 without any explanation.

Mr. Castle is mistaken in some of the claims put forward for originality. The graphical method of solving a quadratic equation (p. 93) has been given before, and is due in the first instance, we believe, to no less a man than Thomas Carlyle. It may be easily extended to the imaginary roots. Some of the other methods claimed we have used in our own teaching for years, with no thought that we were pioneers.

We have noticed misprints on p. 292 (*e*); p. 404, line 12; p. 459, line 13; and an ambiguity of statement in Exercise 1, p. 61, and occasionally elsewhere of the same nature. But the book as a whole is careful, free from serious blemish, and crowded with good material and practical and interesting examples.

The Poetical Works of John Milton. With introductory notes by David Masson, M.A., LL.D. Messrs. Macmillan's beautiful Globe Library in presentation edition is a charming gift for the student at this or any other time of the year. Issued in green limp leather with full gilt top and gilt edges, this volume on Milton is specially suitable for the purpose indicated. The printing is beautifully clear on nice paper, and the binding is such that the book opens and closes easily without strain at the back. The scholarly and complete introductions by Dr. Masson, Professor of English Literature at the University of Edinburgh, enhance the value of so elegant a volume.

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A Historical Geography of the British Empire. By Hereford B. George, M.A. This is a very clear and reliable account of the different parts of the British Empire, and the chapters dealing with the historical development are capital illustrations of cause and effect relations.

JOHN MURRAY.

The Use of Words. By Georgina Kinnear. The writer of this little book has made a bold attempt to grapple with the difficulties of the accidence of grammar, but the result is disappointing. This may be partly due to want of space, for new classifications are sometimes adopted for which the text offers a very imperfect justification. The chapter on tense is very faulty—"have spoken" being called *past* perfect tense, whilst the potential mood still rears its head in the list of moods. The sentences given as examples are often very weak: thus, "The lightning struck a magnificent, an old, and a mighty tree," is not an expansion of "The lightning struck the tree;" or again, "From this point you command a fine view; that from the top of the hill is magnificent," is a faulty antithesis.

Commercial German. By Gustav Hein and Michel Becker. This is the second part of a commercial German course, containing advanced pieces dealing chiefly with trade and market reports. These extracts are numerous and varied, and are drawn from contemporary writers and newspapers. At the end of some of the extracts the English equivalents of German terms employed are given, and in some cases a series of questions in German on the subject of the preceding piece appears. In addition, brief notes in German to each extract are given at the end of the book. The extracts are for the advanced student, and any one who successfully works through the book will greatly enrich his knowledge of commercial German. The book is beautifully printed, and the best German text and roman type has been employed.

In order to assist the private student and the numerous students who attend our evening classes and polytechnics, we suggest that a thoroughly complete vocabulary be added to future editions. The manual is undoubtedly the most complete of its kind, and with this addition would command a wide sale.

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Nelson's Literature Readers. Book II. Edited by Dr. R. Garnett, C.B. This book is intended for use as Book VII. of the Royal Prince or Royal Princess Readers, and consists of carefully selected extracts, both in prose and verse, from the best English writers. The source of each extract is given, and the selections have been made with such care and judgment that our scholars will look forward to the pleasure of reading the whole works from which the episodes are taken. The desire to read good books is one that a school reading book should foster, and the samples are drawn from a wide literary area, and include the best of each kind.

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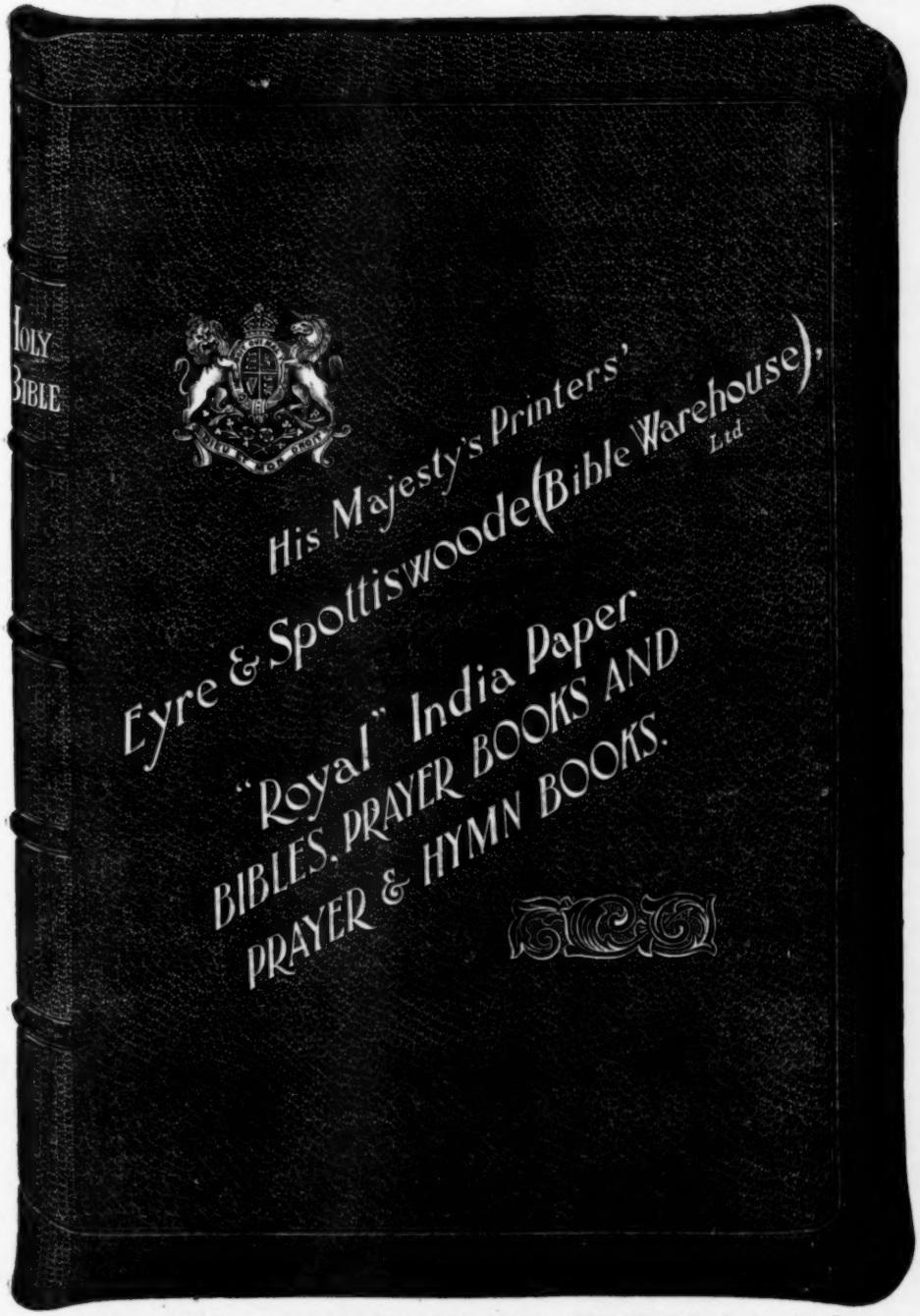

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words the most easily-written symbols. We confess that the idea would have appealed to us more if he had based his system on the frequency of recurrence of sounds. While the founder's method has certain attractions, it is evident that an arbitrary arrangement of this kind, having no relation to the longer and less frequently occurring words, must inevitably land the student in a morass of difficulties sooner or later. The use of circles on the outside of curves permits of the production of extremely ugly outlines. The system does not compare favourably with the one which we use. For instance, the "Oxford" demands two movements of the pen to write "important;" we accomplish it with one movement. "Difficult" and "especially" require four movements each, but we write these words with two movements each. The system has, further, all the advantages and disadvantages of the other joined vowel systems.

GEORGE PHILIP AND SON.

Child Life (October). This is an interesting and helpful number. An article by Earl Barnes on "The Place of Drawing in Elementary Education" may be specially commended to teachers who are asking "what" and "where" in relation to the exercises to be given. The still thorny subject of "Co-education" is discussed by Alice Wood, and Ebenezer Cooke begins an answer to the question, "Is Development from within?" A very true note is struck in "The Early Training of the Imagination" by Mary E. Richmond, while an article on "The Names of Flowers" would show us there *is* something in a name after all.

THE SUNDAY SCHOOL UNION.

The Point of Contact in Teaching. By Patterson Dubois, formerly a secretary of the American Philosophical Society, etc. This little book has the merit of working out its thesis well and exemplifying it fully. That thesis is the old one of the necessity for adapting instruction to the capacity of the learner. It suffers somewhat from the common American disease of wrapping up simple truths in sesquipedalian verbiage, so that the recognition of an old friend sometimes involves unnecessary mental exertions, but occasionally this gives a freshness to familiar ideas which atones for the initial obscurity. The book is specially adapted to the needs of Sunday-school teachers, but may have a wider field of usefulness.

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How to Teach a Foreign Language. By Otto Jespersen, Ph.D., Professor of English in the University of Copenhagen. Translated from the Danish original by Sophia Yhlen-Olsen Bertelsen, M.A. This book is well worth the translating, and has been well translated—that is to say, it has been turned into English which nowhere suggests a foreign original. The case for a more reasonable mode of teaching foreign tongues has rarely been set out with more conclusive arguments. The arguments are always drawn from actual experience, and the better way is always put in the place of the hidebound grammatical method; because the writer is not a mere theorist, but a practical worker in the field of his discussion. One of the most enlightening things about the book is the fact that the author is in a position to tell us of the ridiculous aspect which our own tongue assumes when it is presented to foreign students with the same grammatical rigidity with which we still present French and German to our boys. Dr. Jespersen is no faddist, but an intensely practical teacher, and his experience fully bears out all that has already been preached in this journal and elsewhere as to the advantages of rational teaching in foreign tongues. His book is well worth study by every teacher of languages.

The Story of Arithmetic: A Short History of its Origin and Development. By Susan Connington (late of Newnham College, Cambridge), Assistant Mistress, Brighton and Hove High School, etc. With a preface by Professor W. H. H. Hudson, M.A., etc. With seven diagrams. Whatever can or may render arithmetic more interesting or less repellent to the young student is a gift to be cordially accepted, and it is in this spirit that we receive the present volume. It is readable and not too severely learned, and a large number of useful side lights are thrown by it upon our system of notation and our want of system in standards of measurement. The literary side of the subject is well done—the discussion of ancient text-books, folk-lore, Shakespeare, and the like. The scientific accuracy which such a subject demands whenever a definite statement is offered is not quite so apparent. For instance, Miss Connington tells us that the unit of length adopted for the metric system was "that of a seconds pendulum in the latitude of 45°." Of course "every schoolboy" knows that it professes to be the ten-millionth part of a quadrant of the earth's meridian, though as a matter of fact it is neither the one nor the other.

S. W. THACKERAY.

The Uniclef Music. By Rev. S. W. Thackeray. This is an attempt to combine the advantages of the tonic sol-fa system with those of the staff notation that deserves the attention of every musician. The method, which is intended for instrumental as well as for vocal music, is logical and ingenious; but even after allowance is made for the strangeness of the notation, it strikes one as being difficult for the eye to follow.

UNIVERSITY CORRESPONDENCE PRESS.

Groundwork of Psychology. By G. F. Stout. This book proceeds on somewhat different lines from most of the text-books for beginners. Perhaps it is from force of habit, but personally we prefer to see a closer connection between psychology and physiology in the initial stages of the study. However, Professor Stout has here produced a very valuable text-book of the subject, and the treatment of the emotions is particularly fine.

UNIVERSITY TUTORIAL PRESS.

First Stage Steam. By J. W. Hayward, M.Sc. This little book, as its title implies, is arranged to suit the needs of elementary students, more particularly those concerned with the Board of Education Examinations. Some useful elementary information on mensuration and the uses of squared paper is followed by chapters dealing with the steam-engine and its details, boilers and boiler mountings, heat, energy, etc. One good feature is the numerous and excellent exercises, the answers to which, together with some useful tables and examination papers, are given in an appendix. The book is very suitable for the purpose for which it is intended, and forms an admirable introduction to the subject.

Worked Problems in Higher Arithmetic. By W. P. Workman, M.A., B.Sc., and R. H. Chope, B.A. These examples have been obtained from a wide source, and they include many to which the ordinary text-book rules do not directly apply. The principles underlying the solutions are set out clearly, but, of course, the work is intended for advanced students.

Graphs. By C. H. French, M.A., and G. Osborn, M.A. This little book is intended as a supplement to the *New Matriculation Algebra*, but it may be used with any of the older text-books in which this section is not treated. It is an admirable exposition of the application of graphical or geometrical methods to algebra.

Deakin's Euclid. Books I.–VI. This well-known edition of *Euclid*, with Book V. in outline and containing the propositions of the sixth book set for the Certificate Examination, has been specially adapted for the use of students working for that examination. Some sets of Certificate questions are given at the end.

Readings from Great English Writers. This is an admirable collection of passages from our great writers, preceded in each case by a short biography. We heartily commend the book to all teachers who wish their pupils to form ideas directly from specimens of the work of our literary men, and not from somebody else's opinions about them.

Second Stage Botany. By J. M. Lowson, M.A., B.Sc. After a short introductory chapter, the author gives a full account of the typical vegetable cell, its modifications and physiology. This is followed by a treatment of the different organs of the angiosperm, the cryptogams coming after. The book embodies the latest advances in botanical science, and is excellent in every way. Perhaps the students for whom it is intended would find a glossary a useful addition.

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London at School: the Story of the School Board, 1870–1904. By Hugh B. Philpott. Illustrated. Four years ago we perused what may be called the Autobiography of the London School Board, *The Work of the London School Board*, by Mr. T. A. Spalding, prepared for the Paris Exhibition. Since then that great corporation has joined the majority, and little time has been allowed to elapse between its corporate decease and the appearance of this interesting and well-written biography. Mr. Philpott has already written with inside knowledge and with intelligent appreciation regarding various aspects of School Board work, and some of his papers are reproduced as chapters in this work, where they fall naturally into place. Incidentally many important educational problems are discussed, and their solution or attempted solution described. The book is therefore of permanent value, and will be specially interesting to the hundreds of teachers whose daily labours have helped to build up the great educational system here described. It is well produced and capitally illustrated.

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